UNITED STATES
ATOMIC ENERGY
COMMISSION

16mm FILM CATALOG

POPULAR LEVEL

1966 - 67

REPRINTED WITH ADDITIONS

NOTICE

This printing of the USAEC Film Catalog 1966–67 contains information on 14 films released since the publication of the 1965 edition. Descriptions of the films, which are listed below, are found beginning on page 66.

Subject Category	Title	Understanding Level*
Atoms for Space and SNAP	ATOMIC ENERGY FOR SPACE	(Group 2)
	FIRST REACTOR IN SPACE: SNAP-10A	(Group 1, 2 and 3)
	SNAP-8	(Group 2 and 3)
Biology and Medicine	RADIOISOTOPE SCANNING IN MEDICINE	(Group 3)
	RETURN TO BIKINI	(Group 2 and 3)
Education	TOMORROW'S SCIENTISTS AT ARGONNE	(Group 2 and 3)
Industrial Applications	FARM FRESH TO YOU	(Group 2 and 3)
	THE FRESHER THE BETTER	(Group 2 and 3)
	THE NUCLEAR WITNESS: ACTIVATION ANALYSIS IN CRIME INVESTIGATION	(Group 3)
Nuclear Reactors and Power	ATOMIC POWER TODAY: SERVICE WITH SAFETY	(Group 2 and 3)
Peaceful Uses of Nuclear Explosives (Plowshare)	PLOWSHARE	(Group 2 and 3)
	SAFETY IN THE PLOWSHARE PROGRAM	(Group 3)
Safety, Waste Disposal and Radiation Hazards	ATOMS ON THE MOVE: TRANSPORTATION OF RADIOACTIVE MATERIALS	(Group 2 and 3)
	R-A-P: RADIOLOGICAL ASSISTANCE PROGRAM	(Group 3)

*See page iv.

FOREWORD

USAEC motion pictures listed in this catalog are available for *free* loan, without charge for public non-profit exhibition. All films, except those described as "NOT cleared for television," may be shown on television programs as a public service. Most films, with the few exceptions noted in those film descriptions, are available from USAEC headquarters and field libraries.

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ALPHABETICAL INDEX OF POPULAR FILM TITLES

NOTE: All popular film titles are listed alphabetically for easy reference by those civic, industrial, television, professional, government, education, youth and adult organizations interested in films on atomic energy.

To help teachers and others select those films which will suit the understanding levels of students and audiences, all films in this index are recommended for groups, as indicated.

(Group 1)—Elementary School
(Group 2)—Junior and Senior High School
(Group 3)—College and University

For (Group 3) audiences, also see the USAEC Professional-Level Catalog

A WORD TO NEW BORROWERS

As part of its information and education program, the United States Atomic Energy Commission maintains motion picture libraries from which qualified borrowers throughout the United States and Canada may obtain *16-mm*, sound-track films which explain various aspects of atomic energy.

All of these films are loaned free, and only for educational, non-profit, non-commercial screenings. Also, many are approved for use in unsponsored "public service" telecasts.

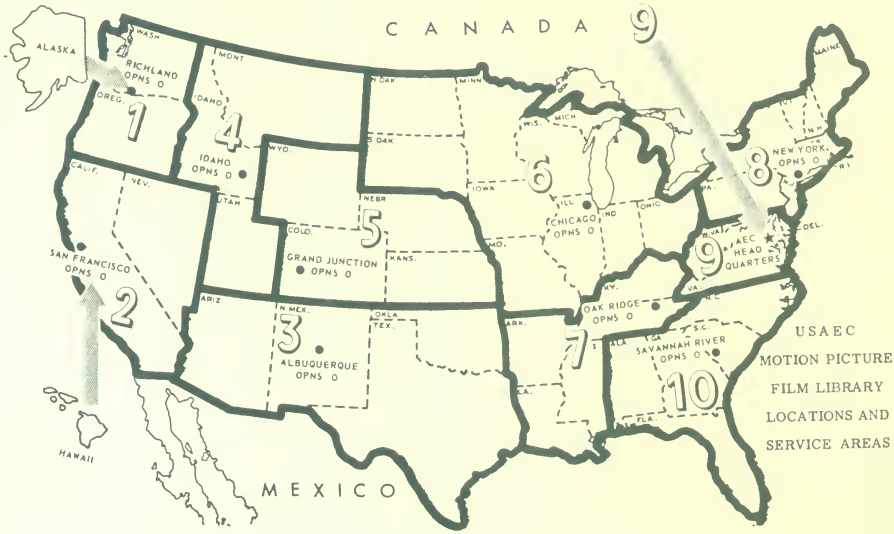
In the catalog, there are 17 subject categories, which are listed in the Table of Contents. The films and cross references are listed alphabetically within each category. As of September 1965, the 10 domestic USAEC Motion Picture Libraries stocked more than 172 different popular titles covering a wide variety of atomic energy subjects. The films listed in this "Popular Level" catalog employ a general treatment to make them as widely understood as possible. In addition, for teacher selection of films best suited for students, the alphabetical listing of titles includes designations for elementary schools as (Group 1), for junior high schools and senior high schools as (Group 2), and for colleges and above as (Group 3).

The USAEC also has available for loan more than 191 other technical films which deal with specific scientific, technological, and engineering aspects of the atomic energy program. These "Professional Level" films are not generally suitable for students below the university level, nor for non-students other than professional scientists, engineers, and technologists. Persons interested in the more specialized films may obtain a copy of the "Professional Level" catalog by writing to the Audio-Visual Branch, Division of Public Information, U. S. Atomic Energy Commission, Washington, D. C. 20545; the Educational Services Branch, Division of Technical Information, U. S. Atomic Energy Commission, Washington, D. C. 20545; or the Division of Technical Information Extension, U. S. Atomic Energy Commission, P. O. Box 62, Oak Ridge, Tenn. 37831.

Subsequent pages of this catalog contain information and instructions designed to make selection and use of these films as trouble-free as possible. In ordering please refer to each film by its full title.

PLEASE NOTE: Title listings and borrowing instructions contained in this catalog pertain directly to the U.S. Atomic Energy Commission's headquarters film library, which serves Delaware, Maryland, Virginia, West Virginia, the District of Columbia, and Canada. Other USAEC film libraries may issue slightly different title listings and instructions tailored to their particular needs. Borrowers should therefore be guided by the specific information supplied by the library which is servicing their requests.

FOREIGN BORROWERS: Please refer to "Advice to Foreign Borrowers," page xvi.



WHERE TO BORROW

Please address your loan requests to the *library* assigned responsibility for your area, even if another library is nearer.

Borrower, If You Live In	Service Area	Address Your Requests To
Alaska, Oregon, Washington	#1	Film Library Information Division U. S. Atomic Energy Commission Richland Operations Office P. O. Box 550 Richland, Washington 99352 509-942-1111, Ext. 64846
California, Hawaii, Nevada	#2	Public Information Office U. S. Atomic Energy Commission San Francisco Operations Office 2111 Bancroft Way Berkeley, California 94704

Arizona, New Mexico Oklahoma, Texas	#3	Film Librarian Information Division U. S. Atomic Energy Commission P. O. Box 5400 Albuquerque, New Mexico 87115
Idaho, Montana, Utah	#4	Mack C. Corbett, Director Office of Information U. S. Atomic Energy Commission Idaho Operations Office P. O. Box 2108 Idaho Falls, Idaho 83401
Colorado, Kansas, Nebraska, Wyoming	#5	Neilsen B. O'Rear, Director Information Division U. S. Atomic Energy Commission Grand Junction Office Grand Junction, Colorado 81502
Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, North Dakota, Ohio, South Dakota, Wisconsin	#6	Ruth Jones Information Office U. S. Atomic Energy Commission Chicago Operations Office 9800 South Cass Avenue Argonne, Illinois 60439 312-739-7711, Ext. 2109
Arkansas, Kentucky, Louisiana, Mississippi, Tennessee	#7	Peggy McConnell, Film Librarian Public Information Office U. S. Atomic Energy Commission Oak Ridge Operations Office P. O. Box E Oak Ridge, Tennessee 37830
Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont	#8	Beatrice Martinelli Public Information Service U. S. Atomic Energy Commission New York Operations Office 376 Hudson Street New York, New York 10014
Delaware, District of Columbia, Maryland, Virginia, West Virginia, and Canada	#9	Sid L. Schwartz Audio-Visual Branch, Division of Public Information U. S. Atomic Energy Commission Washington, D. C. 20545
Alabama, Florida, Georgia, North Carolina, South Carolina	#10	Film Librarian U. S. Atomic Energy Commission Savannah River Operations Office P. O. Box A Aiken, South Carolina 29802 803-824-6331, Ext. 3267

CANADIAN BORROWERS

Residents of Canada may obtain many of the films in this catalog from the National Science Film Library, Canadian Film Institute, 1762 Carling St., Ottawa 13, Ontario, Canada. Films not available from this source may be ordered by writing directly to the Audio-Visual Branch, Division of Public Information U. S. Atomic Energy Commission, Washington, D. C. 20545.

WHO MAY BORROW

Residents of the United States and Canada who are bona fide representatives of educational, civic, industrial, professional, youth activity, and government organizations are invited to borrow films from the USAEC Motion Picture Library which services their area. Because of wear and tear that results from repeated projection, films are loaned for *group* showings, and *not* for screening before individuals or in homes. Because custody of the films involves both legal and financial responsibility, films cannot be loaned to minors.

Television stations may borrow and show all films except those marked "NOT cleared for television."

Television stations desiring to program any of the 28 films produced for the "Magic of the Atom" series by Handel Film Corporation, 6926 Melrose Avenue, Hollywood, Calif. 90038, should obtain the required special permission of the producer before requesting these prints from the USAEC libraries. In some cases, telecasting rights will be arranged by the Audio-Visual Branch, Division of Public Information, USAEC, Washington, D. C. 20545, upon request.

HOW TO ORDER

USAEC Motion Picture Libraries enjoy heavy patronage throughout the year, so it is important that borrowers needing particular titles should make their requests as far in advance of their scheduled showing date as possible. Most USAEC libraries request at least 3 weeks advance notice on all films ordered. Since some titles are booked solidly in advance for several months, borrowers should attempt to specify at least two other acceptable titles and one other acceptable alternate showing date. (Most USAEC libraries respond to all requests involving a conflict with advice on what film will be shipped, and when.)

LOAN REQUIREMENTS

The following requirements apply to all films and all borrowers, regardless of which USAEC Motion Picture Library provides the service:

1. Projection must be on *good* motion picture sound equipment, and by a *trained* operator.

2. No borrower may remove under any circumstances — even temporarily — any footage from USAEC library films on loan to him, either to delete damaged sprocket holes or to edit or digest selected scenes.

3. Films do break, and occasionally will require splicing by the borrower. However, it is preferred that damaged films be returned to the libraries for the professional repairs available there. Do not use "scotch" tape for emergency splices. Either unrepaired damage or splicing accomplished by the borrower should be noted on the "Report of Screenings and Attendance" so that the film may be fully repaired before it is shipped to the next borrower.

4. Borrowers planning to show a number of films on a protracted schedule should request delivery of specific films on a staggered schedule to facilitate maximum use by other borrowers. No borrower may hold a film past scheduled return date without express prior permission of the issuing USAEC library.

5. No borrower may release a USAEC film from his personal possession for reloan to another individual or agency without express prior permission of the issuing USAEC library. Except where heavy demand requires tighter scheduling, borrowers are normally allowed to retain films for four or five days.

6. Borrowers are obligated to complete the "Report of Screenings and Attendance" report enclosed with each film.

7. A few of the libraries, namely New York, Chicago, and San Francisco Operations Offices, prefer that a film be returned to the can after the last screening *without rewinding*. However, most of the remaining USAEC libraries prefer to have film rewound unless they issue specific contrary instructions.

8. Films are shipped from the libraries at government expense, but return shipment charges are borne by the borrower.

9. Films are normally shipped by parcel post, but it is the borrower's responsibility to use any available means — including air express, air mail, or personal delivery — to assure that films being returned shall reach the libraries on or before the due date.

10. Borrowers must reimburse the government for any damage beyond normal wear and tear to USAEC library films, and for any lost films. All libraries require that borrowers insure each reel for $50.00 during its return shipment to provide proof of mailing, to facilitate

tracing of temporarily lost films, and to permit ready replacement of any films lost permanently.

Optimum service to the thousands of borrowers utilizing USAEC Motion Picture Libraries is possible only when each individual borrower complies fully with these requirements. Failure of a borrower to follow the instructions of the library which has serviced his request may result in suspension of the service to the borrower and his organization.

ADVICE TO FOREIGN BORROWERS

Because most of the titles stocked by the USAEC Motion Picture Libraries are in heavy demand by U. S. borrowers and because shipments abroad would involve lengthy, nonproductive periods in transit, it is not considered practical to extend this film library service to other than U. S. and Canadian residents.

However, a number of the titles listed in this catalog have been acquired by the U. S. Information Agency for use in various U. S. Information Service film libraries throughout the world. Residents of each nation should seek assistance directly from the nearest U. S. Information Service at the American Embassy in the capital city of their country.

In addition, prints owned by the USAEC are available for loan to the U. S. Information Agency in Washington, which will arrange to provide prints on a brief loan basis to the U. S. Information Service posts overseas.

Also, the USAEC maintains five film libraries overseas, at its liaison offices at the American embassies in Tokyo, Brussels, London, Buenos Aires, and the U. S. Information Service post at Stockholm. The films are maintained in behalf of the Commission by the U. S. Information Service posts at those embassies. Please direct your inquiry to the USAEC office at the embassy.

Many of the films in this catalog are in the film library of the International Atomic Energy Agency, Vienna; and in the American Film Library, The Hague, Holland.

Residents of Canada see page xiv, for reference to National Science Film Library of Canada, following Listing of U. S. Service Areas.

WHERE TO PURCHASE PRINTS

Most films listed in this catalog may be purchased from private commercial suppliers—NOT the USAEC. It is suggested that organizations which have continuing requirements for repeated screenings of the

same film may find it more satisfactory, and perhaps more economical also, to own a print than to borrow it.

In the Description of Films, wherever possible the commercial supplier from whom prints may be purchased, and also the approximate price as known is indicated. Since prices may change, it is suggested that prospective purchasers obtain up-to-date quotations before ordering, by writing to the proper commercial supplier:

AEROJET-GENERAL CORPORATION
Contracts Division
Azusa, California 91703

B & O FILM SPECIALISTS
619 West 54th Street
New York, N. Y. 10001

BYRON MOTION PICTURES
1226 Wisconsin Avenue, N. W.
Washington, D. C. 20007

CALVIN PRODUCTIONS, INC.
1105 Truman Road
Kansas City, Missouri 64106

CAPITAL FILM LABORATORIES, INC.
470 E Street, S. W.
Washington, D. C. 20024

CHAMBER OF COMMERCE OF THE UNITED STATES
Audio-Visual Services Department
1615 H Street, N. W.
Washington, D. C. 20006

COLBURN, GEO. W., LABORATORY, INC.
164 North Wacker Drive
Chicago, Illinois 60606

COLOR SERVICE CO., INC.
115 West 45th Street
New York, N. Y. 10036

COLORADO MINING ASSOCIATION
204 State Office Building
Denver, Colorado 80200

CONSOLIDATED FILM INDUSTRIES
959 Seward Street
Hollywood, California 90038

CONTEMPORARY FILMS, INC.
267 West 25th Street
New York, N. Y. 10001

CORONET INSTRUCTIONAL FILMS
Coronet Building
Chicago, Illinois 60600

DuART FILM LABORATORIES, INC.
245 West 55th Street
New York, N. Y. 10019

ENCYCLOPAEDIA BRITANNICA FILMS, INC.
1150 Wilmette Avenue
Wilmette, Illinois 60091

FILMSERVICE LABORATORIES
6327 Santa Monica Boulevard
Hollywood, California 90038

GENERAL ELECTRIC COMPANY
Film Production and Distribution
60 Washington Avenue
Schenectady, New York 12305

GENERAL FILM LABORATORIES
1546 North Argyle Avenue
Hollywood, California 90028

GERALD PRODUCTIONS, INC.
421 West 54th Street
New York, N. Y. 10019

HANDEL FILM CORPORATION
6926 Melrose Avenue
Hollywood, California 90038

IOWA STATE UNIVERSITY
Film Production Unit
Alice Norton House
Ames, Iowa 50010

LANE, ANTHONY, STUDIOS, INC.
7401 Wayzata Boulevard
Minneapolis, Minnesota 55416

LOOKOUT MOUNTAIN AIR FORCE STATION, USAF
8935 Wonderland Avenue
Hollywood, California 90046

McGRAW-HILL BOOK COMPANY
330 West 42nd Street
New York, N. Y. 10036

MPO DISTRIBUTION, INC.
15 East 53rd Street
New York, N. Y. 10022

NATIONAL FILM BOARD OF CANADA
680 Fifth Avenue
New York, N. Y. 10019

NAVAL PHOTOGRAPHIC CENTER
U. S. Navy
Anacostia. D. C. 20390

NET FILM SERVICE
Audio-Visual Center
Indiana University
Bloomington, Indiana 47405

ORLEANS FILM PRODUCTIONS
Ford Place
Knoxville, Tennessee 37900

PALMER, W. A., FILMS, INC.
611 Howard Street
San Francisco, California 94105

PARAMOUNT PICTURES CORPORATION
1501 Broadway
New York, N. Y. 10036

REED, ROLAND, PRODUCTIONS, INC.
8822 Washington Boulevard
Culver City, California 90231

U. S. DEPARTMENT OF AGRICULTURE
Motion Picture Service
Washington, D. C. 20250

UNITED WORLD FILMS
221 Park Avenue South
New York, N. Y. 10003

USAEC STOCK FILM FOOTAGE PROGRAM

The U. S. Atomic Energy Commission, to encourage education and information in the field of atomic energy, has made available for motion picture and television producers 16-mm color and 35-mm or 16-mm black-and-white stock film footage covering nearly all aspects of this broad program.

Color stock footage in 16-mm is available from the completed color films made by the USAEC and its national laboratories and contractors. Producers are invited to make *footage counts* on films borrowed from the film libraries and then to contact the Audio-Visual Branch, as noted below for information on how to obtain duplicating material. Producers are *not* permitted to clip films borrowed from the film libraries.

More than 120,000 feet of unedited 35-mm and 16-mm black-and-white stock film footage without sound track is also available. The material covers unclassified aspects of nationwide USAEC and contractor research and operations at 13 installations, including the national laboratories.

It should be noted that these materials are NOT COMPLETED MOTION PICTURES FOR GENERAL SHOWING AND ARE NOT FOR LOAN.

The footage is being distributed at standard government cost rates through a government depository. Subject matter lists and information sheets are available.

The footage, although unedited, has been assembled in progression to aid producers in making complete motion pictures, adding their own film editing, narration, titles, etc. Detailed script notes are available to qualified users of the footage in the educational motion-picture field,

television, industrial and educational organizations, government agencies, etc.

Requests to search and draw from the black-and-white footage, and any other inquiries, should be addressed to the Audio-Visual Branch, Division of Public Information, U. S. Atomic Energy Commission, Washington, D. C. 20545.

DESCRIPTION OF POPULAR FILMS (by Subject Category)

AGRICULTURE

THE ATOM AND AGRICULTURE (1953). 10 minutes, black and white.
Produced by, and for sale by, Encyclopaedia Britannica Films, at $62.15 per print, including shipping case. NOT cleared for television.

This nontechnical film, for intermediate through college-level audiences, explains the use of radiation, including radioisotope tracers, for photosynthesis research, study of fertilizer uptake and use, and to effect genetic changes in corn and other crops.

ATOMIC AGE FARMER (Magic of the Atom Series) . . See page 54

ATOMIC GREENHOUSE (Magic of the Atom Series) . . See page 55

ATOMS ON THE FARM . . . . . See page 18

HARVEST OF AN ATOMIC AGE (1963). 20 minutes, color.
Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

Produced with the technical assistance of the USAEC, Brookhaven National Laboratory and Michigan State University, the film illustrates the progress achieved by U. S. scientists in using radiation to create new strains of disease- and weather-resistant food crops with higher yields. We see both the research work at USAEC's Brookhaven National Laboratory and the field work with new varieties of commercial crops. The specific example shown is the development of the Sanilac bean by Michigan State University plant geneticists. The Sanilac bean is disease-resistant and stands upright, permitting machine-harvesting. The film explains simply the theories of radiation-induced plant mutations, the methods, and the complexity of the long-term work.

RADIATION: SILENT SERVANT OF MANKIND (Magic of the Atom Series) . . . . . See page 57

RADIOISOTOPES IN BIOLOGY AND AGRICULTURE (Understanding the Atom Series) . . . . . See page 62

RIDDLE OF PHOTOSYNTHESIS (Magic of the Atom Series). . . . . See page 57

ROUNDUP (1960). 18¼ minutes, color.

Produced by, and for sale by, the U. S. Department of Agriculture, Motion Picture Service, at $80.00 per print, including shipping case, F.O.B. Washington, D. C.

This film describes the use of radiation to eradicate the screwworm fly in the southeastern United States, an insect pest that had caused large losses to livestock owners. The film describes how the screwworm fly deposits its eggs in a cut or insect bite on the skin of a warm-blooded animal. The eggs hatch to worms that feed on live flesh and then fall to the ground, where they burrow into the soil and change to pupae. Ten days later the fly emerges and mates, and the cycle continues. The film shows typical cases of screwworm infestation. Entomologists of the Agricultural Research Service suggested that since screwworm flies mate only once, if a method of sexually sterilizing flies could be found, eradication was possible. Since X ray was too expensive, radioactive cobalt (^{60}Co) was selected to do the sterilization job. The plan was tested on the tiny island of Curaçao off the coast of Venezuela, where sterilized male flies were released from aircraft in patterns over the island. In six months the pest was eliminated. Similar operations were followed in Florida and other southeastern states. A huge screwworm factory was built in Florida, where 50 million flies were reared and sterilized in a week, with pupae subjected to 8000 roentgens of gamma rays. Ten million sterilized male flies were airdropped on infested areas. Eventually the screwworm fly was brought under full control and largely eradicated. (Nontechnical: suitable for all audience levels.)

TRACING AIRBORNE RADIOACTIVITY (Challenge Series) . . . . . See page 52

ATOMS FOR SPACE AND SNAP

ATOMIC WEATHERMAN: STRONTIUM-90 ISOTOPIC APPLICATIONS . . . . . See page 13

ATOMS FOR SPACE (1962). 28½ minutes, color.

Produced by Atomics International and the Martin Company for USAEC. For sale by General Film Laboratories, at $125.00 for one print, including shipping case, prepaid parcel postbook rate.

This film describes the development and use of compact nuclear power sources for space under the Atomic Energy Commission's Systems for Nuclear Auxiliary Power (SNAP) program. The film features the first use of atomic power in the nation's space effort and briefly covers the uses of SNAP devices on land and sea. By means of animation and models, the two basic concepts of the SNAP program are shown. In one approach the energy of decay from radioactive isotopes is used to generate electricity directly, without moving parts. This method is being developed for the USAEC by the Martin Company, the aerospace division of the Martin Marietta Corporation. A SNAP isotopic-power generator was launched on board the Navy's Transit navigation satellite in June 1961, marking the first use of nuclear power in space. The other SNAP approach uses the heat from a compact nuclear-fission reactor to generate electricity by a turbogenerator system or by direct conversion. The nuclear-reactor systems being developed by Atomics International, a division of North American Aviation, Inc., will provide from 500 to 60,000 watts of electricity in space for one year. They can provide power for a satellite network for worldwide communications, weather observation, and navigation. The film briefly summarizes the importance of the use of space in the areas of communications; weather observation; research; navigation; astronomy and exploration; and the consequent need, as space technology advances, for more compact electrical power sources. A detailed explanation is given of the isotopic-power source aboard the Transit-4A navigational satellite, which produces almost 3 electrical watts — enough to power two of the satellite's four navigational radio transmitter systems for five years or more. The isotopic-powered navigation equipment is transmitting precise signals that are being received all over the globe. The operational Transit satellite system will provide navigational information from which aircraft and ships around the world will be able to fix their positions within 0.1 mile. The film reviews the various nuclear-reactor-powered units, including SNAP-2, which will provide 3000 watts of electricity in space for one year; SNAP-10A, which will provide 500 watts for one year; and SNAP-8, which will generate up to 60,000 watts and will pioneer electric propulsion in the U. S. space program. SNAP power systems in three satellites in 24-hr orbit around the earth could provide a worldwide TV network with multilingual audio channels. Safety factors and safety testing of both types of SNAP units are shown. Since the fuel of the isotopic devices is radioactive itself, the capsule has been designed to keep it sealed on the launching pad, during launch, and in orbit. The SNAP nuclear-reactor systems are being so designed that, after a useful long life in space, they will shut down, cool off radioactively for a long period, and finally burn up on reentry. The small amount of remaining activity will be widely dispersed safely in the vast area of the outer atmosphere. SNAP systems also have uses in remote areas on land and sea. An unmanned gen-

erator that transmits weather data to permanent Canadian and U. S. weather stations is now in operation in the Canadian Arctic (see film "Atomic Weatherman"). A more powerful version of this unit, with a potential life of 10 years, is supplying power for an unmanned automatic weather station in the Antarctic. Other SNAP devices will be used for sea buoys, navigation beacons, and portable electric-power stations. The film also briefly summarizes some of the planned space efforts of the future which will use nuclear auxiliary power.

NUCLEAR POWER FOR SPACE—SNAP 9A (1963). 12 minutes, color. Produced by the Martin Company. For sale by Byron Motion Pictures, at $37.26 per print, including shipping case.

This is a semitechnical film for high-school- and college-level audiences. After showing the launching of a new satellite, which is being wholly powered by a nuclear generator, animation is used to explain the use of its isotopic generator to create power to run electronic equipment, recording equipment, and transmit data back to earth for analysis. The advantages of nuclear energy are shown over the use of chemical energy and solar energy. The principles of power generation by isotopic decay are explained, showing how thermocouples convert the decaying isotopes' heat directly to electricity. A comparison of the isotopes Plutonium-238 and Curium-242, both used in SNAP isotope power systems, is made. It discusses the design features of the SNAP-9A which are the result of 7 years of research. Safety tests of the isotope capsule, including explosion tests, fire tests, impact tests, and re-entry tests are shown.

NUCLEAR REACTORS FOR SPACE (1961). 17 minutes, color. Produced by Atomics International for the USAEC. For sale by Byron Motion Pictures, at $54.05 per print, including shipping case, F.O.B. Washington, D. C. Also available for free loan from Atomics International, P. O. Box 309, Canoga Park, Calif. 91305.

The SNAP program—Systems for Nuclear Auxiliary Power—is an AEC program to develop long-lived auxiliary power from nuclear energy for use in satellites and space vehicles. Compact atomic reactors being developed by Atomics International for use in SNAP systems are shown in this semitechnical film. Safety characteristics of the SNAP reactor during fabrication, testing, transport, installation, launching, and use in space are described. Detailed sequences filmed at Atomics International on fabrication and testing show the simplicity and compactness of the reactors. Safety features are described in scenes that illustrate shipping, launch-site activities, and launch of the reactor into space. The burnup and dispersal of the reactor during reentry into the atmosphere are shown in a detailed animation sequence. Many beneficial uses of SNAP in the U. S. national space program are illustrated.

OUR NEAREST STAR (1961). 12 minutes, color.

Produced by the Nuclear Division of the Martin Company. For sale by Byron Motion Pictures, at $48.26 per print, including shipping case.

A SNAP isotopic power system has been placed in orbit aboard the Transit-4A navigational satellite. This simple, powerful device is the first application of nuclear power in space. The system, which powers two of Transit's four navigational radio transmitters, is designed to operate for five years or more. Against a background of the Transit Program, this semitechnical film follows the development and testing of the radioisotope fuel capsule and the thermoelectric generator that make up this SNAP system. The film shows the Thor-Able-Star gantry at Cape Kennedy as the SNAP unit is mounted on Transit, and, when the system is launched, the view is from the blockhouse and the launch pad.

PAX ATOMIS: SNAP-7 TERRESTRIAL ISOTOPIC POWER SYSTEMS (1965). 25 minutes, color.

Produced for the USAEC by the Martin Company. For sale by Gerald Productions, at $90.64 per print, including shipping case, F.O.B. New York City.

Useful to both educated-lay-level and technical audiences, including high school and college groups, this film summarizes the parallel development of a family of fully shielded thermoelectric power converters and chemical processing of the radioisotope Strontium-90 fuel. Laboratory procedures are depicted for thermoelectric couple assembly into a compact operating system capable of converting heat energy into electrical current without the need for moving parts. Compacting of Strontium-90 raw material into ceramic titanate pellets and encapsulation of the fuel pellets into high strength metal containers are illustrated.

Fully shielded Strontium-90 fueled, thermoelectric generators have been placed into operational service at remote outposts from north of the Arctic Circle to the South Pole. Developed by the U. S. Atomic Energy Commission under the SNAP (Systems for Nuclear Auxiliary Power) program, they are now proving the feasibility of reliable, unattended electrical power production from heat generated by decay of radioisotopes.

Installation of the SNAP-7 generator family—to power unattended weather stations in Antarctica and the Gulf of Mexico, navigational aids to shipping in Chesapeake Bay and the Gulf of Mexico, deep sea acoustic research in the Atlantic Ocean—is depicted by means of film footage obtained during actual installation and implantment at the operating sites.

The film concludes with a description of current development work and predictions relating to the next generation of Strontium-90 thermoelectric power supplies for terrestrial uses.

POWER FOR PROPULSION (1965). 15 minutes, color.

Produced by the Aerojet-General Corporation. Queries on sale of prints should be directed to Aerojet-General Corporation.

This film traces the history of power sources for propulsion from Watt's tea kettle to atomic rocket engines. The major steps are covered: Goddard's 1926 rocket engine, the German V-2's, U. S. Aerobees and Vikings, the Soviet 1957 Sputnik followed by the first astronauts and then reactor power for ships. The importance of Robert Goddard's liquid rocket and Enrico Fermi's atomic pile is stressed, with particular emphasis upon the inevitable fusion of these two great power sources into one massive propulsion system. Animation sequences are used to illustrate principles of rocketry, Newton's Law of Motion and operation of nuclear rocket engines. Actual development of NERVA, Nuclear Engine for Rocket Vehicle Application, is shown, including its first test firing at the AEC-NASA Nuclear Rocket Development Station in Jackass Flats, Nevada. Finally, U. S. developments for deep space pay-load missions to the moon, a fly-by of Mercury, then Venus, Mars and beyond for new insights into the universe.

PROJECT ROVER (1963). 21½ minutes, color.

Produced by the USAEC's Los Alamos Scientific Laboratory. For sale by the Calvin Productions, at $58.33 per print, including shipping case, F.O.B. Kansas City.

This film is a 1962 progress report on the USAEC's Project Rover, a program for the development of a nuclear rocket for spacecraft propulsion. An animated explanation of the principle of the nuclear rocket is given demonstrating the advantages of the nuclear rocket system. A survey of the work at the Los Alamos Scientific Laboratory follows, showing work done in the design, fabrication and testing of a Kiwi nonflying test reactor. This includes: core configuration studies in a "Honeycomb," the reactor design staff at work, the test facilities, the blending of graphite and uranium for fuel, and construction of the reactor components by contractors. Testing of the Kiwi at the Nuclear Rocket Development Station in Nevada is shown.

SNAP III OPERATIONAL TESTS (1960). 18 minutes, color.

Produced for the USAEC by the Martin Company, Nuclear Division. For sale by Byron Motion Pictures, at $62.37 per print, including shipping case.

This semitechnical film describes operational tests (vibration, shock, acceleration, fire, explosion, land and sea impact, effects of salt water, aerodynamic heating, etc.) on the 4-lb SNAP III isotopic-power unit, which uses ^{210}Po to generate more than 3 watts as a source of auxiliary power for space vehicles. Conclusion: SNAP III will operate effectively on launch and in orbit.

SNAPSHOT (1965). 29 minutes, color.

Produced for the USAEC by Atomics International. For sale by General Film Laboratories, at $95.00 per print, including shipping case, F.O.B. Hollywood.

This film with an introduction by Dr. Glenn T. Seaborg, Chairman of the U. S. Atomic Energy Commission—useful for both popular-level and technical audiences—describes the scheduled flight test in space of the 500-watt SNAP-10A nuclear space power system. SNAP-10A will be mated to the forward end of an Atlas-Agena booster system and launched from Vandenberg Air Force Base, California. Primary objective of the SNAPSHOT flight, a cooperative effort of the Atomic Energy Commission and the United States Air Force, is to obtain technical information and demonstrate the utility of nuclear reactor power systems for application in America's space programs. Atomics International is the U. S. Atomic Energy Commission's prime contractor for SNAP-10A development. Orbital startup and operation in space of the reactor and the thermoelectric power converter is explained by animation. Highlighted in this film is the extensive development and testing program which has resulted in the flight-ready SNAP-10A power system. A series of qualification system tests, including a full-scale nuclear system ground test in a simulated space environment, is reviewed and summarized. This series of tests duplicated the environments the flight system will endure through factory assembly, shipping, launch, and orbit operation. The film explains the need for SNAP reactor power systems in current and future space projects.

ATOMIC ENERGY PRINCIPLES

A IS FOR ATOM (Revised version, 1964). 15 minutes, color.

Produced by, and for sale by, the General Electric Company, at about $120.00 per print, including shipping case. NOT cleared for television.

This nontechnical, fully animated film, for elementary through high school-level audiences, explains the structure of the atom using an analogy to the solar system, discusses natural elements and artificially produced elements showing how they are identified by number, describes stable and unstable atoms, and tells of the discovery of nuclear fission. It explains how a chain reaction is produced, describes the principles of a nuclear reactor and its application for electrical power and propulsion, and reviews some of the many benefits of atomic radiation in industry, biology, medicine, and agriculture.

ALPHA, BETA, GAMMA (Understanding the Atom Series) . . . .
. . . . . See page 58

ATOMIC ENERGY (1950). 10 minutes, black and white.
Produced by, and for sale by, Encyclopaedia Britannica Films, at $62.15 per print, including shipping case. NOT cleared for television.
This film for intermediate and high school-level audiences offers an introduction to atomic principles. With animation, it explains the structure of the atom and defines protons, electrons and neutrons. It describes the process of nuclear synthesis and shows how, through photosynthesis, the sun's energy is stored on earth and released through combustion. The fission process and the chain reaction are also described.

ATOMIC FURNACES (Challenge Series) . . . . . See page 49

ATOMIC PHYSICS (1948). 90 minutes (2 reels), black and white.
Produced by J. Arthur Rank Organisation, Ltd. For sale by United World Films, at $523.00 per print, including shipping case. NOT cleared for television.
This film discusses the history and development of atomic energy, stressing nuclear physics. Dalton's basic atomic theory, Faraday's early experiments in electrolysis, Mendeleev's periodic table, and early concepts and size of atoms and molecules are discussed also. The film demonstrates how cathode rays were investigated and how the electron was discovered; how the nature of positive rays was established; how X rays were found and put to use. The film also presents research tools of nuclear physics, explains work of Joliot-Curie and Chadwick in discovery of neutron, and splitting of lithium atom by Cockcroft and Walton. Einstein tells how their work illustrates his theory of equivalence of mass and energy. Uranium fission is explained, as well as why it is possible to make an atomic bomb.

BASIC PRINCIPLES OF POWER REACTORS . . . . See page 23

BETA RAY SPECTROMETER (1963). 7 minutes, 5 seconds, color.
Produced by the USAEC's Argonne National Laboratory. For sale by Byron Motion Pictures, at $22.71 per print, including shipping case, F.O.B. Washington, D. C.
By animation and live action, this film explains the principles and working of the Coincidence Beta Ray Spectrometer, a device which is used to measure the intensity and direction of electron emissions known as beta particles. Components of the device are shown and assembled. A source is introduced. Masking for beam direction and size is demonstrated. Detectors are shown and explained.

A BREEDER IN THE DESERT (Challenge Series) . . . See page 49

CONTROLLING ATOMIC ENERGY (1961). 13½ minutes, color.

Produced by, and for sale by, United World Films, at $135.00 per print, including shipping case. NOT cleared for television.

A basic teaching film (which uses the conversation of a young student and a scientist who is writing a book about atomic energy) summarizing, briefly, by live action and animation, the following: what is an atom; radioactive atoms; measuring radioactivity; uranium; nuclear fission; the chain reaction; the controlled chain reaction in reactors; how reactors are used for production of electricity for power and propulsion; and the production of radioisotopes for applications in biology, medical diagnosis and therapy, agriculture, industry, and research. (For students in the 5th to 8th grades.)

FOUNDATIONS FOR THE FUTURE (Challenge Series) . . . . . See page 50

THE FUEL OF THE FUTURE (Challenge Series) . . . See page 50

INTRODUCING ATOMS AND NUCLEAR ENERGY (1963). 11 minutes, black and white or color.

Produced by, and for sale by, Coronet Instructional Films, at $60.00 per print in black and white, and $121.50 in color, including shipping case. NOT cleared for television.

Although this teaching film—explaining the general structure of the atom and showing how changes in the nucleus may produce energy used by man—was prepared for intermediate grades and junior high school use it will also be useful for lay-level adult audiences that wish a basic, concise primer on the subject. The film discusses: the composition of atoms—protons and electrons; how the nucleus releases the energy of the atom by losing particles (decomposition); nuclear fission, chain reaction and nuclear reactors; nuclear fusion in the sun; and, very briefly, the uses of nuclear energy. (Suitable for students from the 4th through 9th grades.)

INVISIBLE BULLETS (Challenge Series) . . . . . See page 51

MICROSCOPE FOR THE UNKNOWN (Challenge Series) . See page 51

PRINCIPLES OF THERMAL, FAST AND BREEDER REACTORS (1963). 9 minutes, color.

Produced by USAEC's Argonne National Laboratory. For sale by Byron Motion Pictures, at $27.09 per print, including shipping case, F.O.B. Washington, D. C.

This animated film offers an explanation of nuclear fission, the chain reaction, and the control of this reaction in three basic types of reactors. It describes the principles of fast and thermal reactors and introduces the concepts of the moderator and reflector. The breeder principle is described, and plutonium and thorium cycles are indicated. (This film can be used as a companion to "Basic Principles of Power Reactors.")

PROPERTIES OF RADIATION (Understanding the Atom Series) . . . . . See page 59

RADIATION AND MATTER (Understanding the Atom Series) . . . . . See page 60

SEARCHING FOR THE ULTIMATE (Challenge Series) . . . . . See page 52

UNLOCKING THE ATOM (1950). 20 minutes, black and white.

Produced by, and for sale by, United World Films, at $120.00 per print, including shipping case. NOT cleared for television.

Primarily for junior- and senior-high-school audiences, this film explains the principles that govern the atom and its uses. It describes: chain reaction; atomic structure; properties of alpha, beta, and gamma rays; cyclotrons; and contributions of various scientists.

BIOLOGY AND MEDICINE

THE ART OF SEPARATION (Challenge Series) . . . . See page 49

THE ATOM AND BIOLOGICAL SCIENCE (1953). 12 minutes, black and white.

Produced by, and for sale by, Encyclopaedia Britannica Films, at $62.15 per print, including shipping case. NOT cleared for television.

This is a technical film for intermediate through college-level audiences. It identifies and illustrates uses of radioactivity in several areas of biology; effects of radiation on growth and heredity of plants and animals; tracer studies; photosynthesis studies; and measures to protect the investigating scientists.

THE ATOM AND THE DOCTOR (Magic of the Atom Series). . . . . See page 53

THE ATOM IN THE HOSPITAL (Magic of the Atom Series) . . . . . See page 53

ATOMIC BIOLOGY FOR MEDICINE (Magic of the Atom Series) . . . . . See page 54

THE ATOMIC ZOO (Magic of the Atom Series) . . . . See page 56

ATOMS FOR HEALTH (Magic of the Atom Series) . . . See page 56

BIKINI RADIOBIOLOGICAL LABORATORY (1949). 22 minutes, color.

Produced by the University of Washington and the USAEC. For sale by Lookout Mountain Air Force Station, USAF, at $92.00 per print from master, including shipping case.

This nontechnical film, for intermediate through college-level audiences, explains studies of effects of radioactivity from the 1946 atomic tests at Bikini Atoll, on plants and marine life in the area three years later.

BUILDING BLOCKS OF LIFE (Challenge Series) . . . See page 49

DOWN ON THE FARM (Challenge Series). . . . . See page 50

THE ETERNAL CYCLE (Magic of the Atom Series) . . See page 56

FOUNDATIONS FOR THE FUTURE (Challenge Series) . . . . . See page 50

THE IMMUNE RESPONSE (Challenge Series) . . . . See page 50

THE LIVING SOLID (Challenge Series). . . . . See page 51

MEDICINE (1957). 20 minutes, color.

Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

This nontechnical film gives four illustrations of the use of radioactive materials in diagnosis and therapy; exact pre-operative location of brain tumor; scanning and charting of thyroids; cancer therapy research; and the study of blood diseases and hardening of the arteries.

RADIATION AND THE POPULATION (Challenge Series). . . . . See page 51

RADIATION IN BIOLOGY: AN INTRODUCTION (1962). 13½ minutes, black and white or color.

Produced by, and for sale by, Coronet Instructional Films, at $75.00 per print for black and white, and $150.00 for color. NOT cleared for television.

The purpose of this film is to explain to junior and senior high-school students in biology, general science, or physics the meaning of high-energy radiation and to show how this radiation is used in biological research. To accomplish its objective, this film briefly reviews light from the sun (wave radiation), radio waves, X rays, etc. It also touches on the various sources of radiation (X-ray machines, nuclear reactors, cosmic rays, the sun, etc.). Radioisotopes are defined, and their life is traced from production through their use as tools in the study of radiation damage. The effect of radiation on living cells is demonstrated by comparisons of plants grown from irradiated and nonirradiated seeds and of mice that had been irradiated with those that had not been irradiated. The film also shows the effects of radiation on bone marrow, on the protective lining of the intestine, and on chromosomes (mutations). The use of radioisotopes to trace chemical processes in plants (the absorption of nutrients) is also covered. Autoradiographs are explained, and the function of a Geiger counter is outlined. The film was made under the technical direction of Dr. Harvey Patt, Division of Biological and Medical Research at USAEC's Argonne National Laboratory (ANL), and photographed at ANL.

RADIATION PROTECTION IN NUCLEAR MEDICINE (1962). 45 minutes, color.

Produced by Fordel Films, for the Bureau of Medicine and Surgery of the U. S. Navy. Sales inquiries should be directed to the Naval Photographic Center.

This semitechnical film demonstrates the procedures devised for naval hospitals to protect against the gamma radiation emitted from materials used in radiation therapy. However, its principles are applicable in all hospitals. The practices demonstrated are based on three principles established at the outset. The film explains the nature of gamma radiation relative to how time, distance, and shielding are used to provide protection from its harmful effects. Time is considered in two ways: (1) the half life of the radioactive materials used; and, (2) the speed in handling them. The film shows the continuous application of these principles from the moment radioactive materials are received at a hospital, through their storage, their preparation for use, their therapeutic administration, the nursing care of radioactive patients, and the disposal of radioactive human waste. The film details the special techniques and equipment used in the handling of radium and radioactive gold, iodine, and iridium as representing the variety of such materials that hospital personnel encounter and the consequent variations in time, distance, and shielding employed as protection against them. The use of monitoring devices and the maintenance of records of their readings form a recurrent theme throughout the film. It makes the dual point that radiological-safety records are used (1) to provide immediate protection for hospital personnel; and, (2) as a basis on

which the staff can reevaluate and improve techniques, always with the purpose of keeping the exposure of each person below the established maximum permissible levels.

RADIATION: SILENT SERVANT OF MANKIND (Magic of the Atom Series) . . . . . See page 57

RADIOISOTOPE APPLICATIONS IN MEDICINE (Understanding the Atom Series) . . . . . See page 61

RADIOISOTOPES IN BIOLOGY AND AGRICULTURE (Understanding the Atom Series) . . . . . See page 62

TIME—THE SUREST POISON (Challenge Series) . . . See page 52

TRACING AIRBORNE RADIOACTIVITY (Challenge Series) . . . . . See page 52

TRACING LIVING CELLS (Challenge Series) . . . . See page 52

EDUCATION

THE ALCHEMIST'S DREAM (Challenge Series). . . . See page 49

ATOMIC WEATHERMAN: STRONTIUM-90 ISOTOPIC APPLICATIONS (1961). 18½ minutes, color.

Produced by the Martin Company. For sale by Capital Film Laboratories, at $103.90 per print, including shipping case.

This semitechnical film describes the world's first radioisotope-powered weather station, which is operating unattended at a remote site in the Canadian Arctic. The "atomic" weather station is powered by a thermoelectric unit in which the heat from the decay of Strontium-90 (^{90}Sr) is directly converted into electricity. The film shows the major steps in the identification, testing, and preparation of the ^{90}Sr titanite compound; the loading of the radioisotope source in the weather-station generator; the principle of direct conversion of heat into electricity; the operation of the generator; the weather-station equipment for sensing, data processing, and control and transmission; the final testing; the 4000-mile journey north into the remote Canadian Arctic aboard an icebreaker; the weather-station installation; and the successful transmission of weather data. The film explains the principal methods of handling radioactive wastes from nuclear-reactor operations; the techniques for recovering valuable radioisotopes, such as ^{90}Sr; and the development of ^{90}Sr thermoelectric sources for unique small-scale power applications. Brief information is also given on other applica-

tions of ^{90}Sr thermoelectric devices. (Semitechnical: suitable for high-school and educated-lay audiences.)

A CHEMICAL SOMERSAULT (Challenge Series) . . . See page 50

FOUNDATIONS FOR THE FUTURE (Challenge Series) . . . . . See page 50

HARNESSING THE RAINBOW (Challenge Series) . . . See page 50

INVISIBLE BULLETS (Challenge Series) . . . . . See page 51

MACHINES THAT THINK (Challenge Series). . . . . See page 51

MICROSCOPE FOR THE UNKNOWN (Challenge Series) . . . . . See page 51

RADIATION AND THE POPULATION (Challenge Series). . . . . See page 51

SEARCHING FOR THE ULTIMATE (Challenge Series) . . . . . See page 52

TECHNICAL INFORMATION SERVICES OF THE AEC (1961). 20 minutes, color.

Produced under the supervision of USAEC's Division of Technical Information by, and for sale by, the U. S. Department of Agriculture Motion Picture Service, at $92.00 per print, including shipping case.

This film, presented in nontechnical language, surveys what is available in the unclassified atomic energy literature and discusses how the information may be located, obtained, and used. Describing in detail the services of the USAEC Division of Technical Information, the film holds special interest for librarians, engineering and scientific groups, research and development organizations, and teachers and students at the senior-high-school level and above. The film gives a brief look at the forms in which atomic energy information becomes available: research and development reports, technical progress reviews, bibliographies, technical books, translations, papers presented at professional meetings, engineering materials, other special publications, and films. It reviews in some detail *Nuclear Science Abstracts*, the only unclassified journal devoted solely to announcing and abstracting atomic energy scientific and technical literature published throughout the world. The viewer learns also of the various bibliographies that are prepared on specialized subjects and of special literature searches that are provided by the USAEC at a nominal rate. The film details the wealth of

information available at 96 domestic and 86 foreign USAEC depository libraries located throughout the world. The availability on Microcards and microfiche of all technical information offered by the USAEC, including that in more than 70,000 published USAEC research and development reports, is explained. Also described is the USAEC sponsorship of a technical book-writing program, the exchange of technical information with other nations, an active program for translating foreign monographs, publication of quarterly Technical Progress Reviews for the use of industry, the reproduction of engineering drawings and related information, and the production and distribution of motion pictures on atomic energy which are designed to serve either professional or general audiences.

TRACING LIVING CELLS (Challenge Series) . . . . See page 52

INDUSTRIAL APPLICATIONS

THE ATOM AND INDUSTRY (1953). 10 minutes, black and white.

Produced by, and for sale by, Encyclopaedia Britannica Films, at $62.15 per print, including shipping case. NOT cleared for television.

This is a nontechnical film, for intermediate through college-level audiences, describing the use of radioisotope tracers in industry for gauging thickness, testing engine wear, monitoring oil in pipelines, etc.

THE ATOM IN INDUSTRY (Magic of the Atom Series) . . . . . See page 53

A BREEDER IN THE DESERT (Challenge Series) . . . See page 49

A CHEMICAL SOMERSAULT (Challenge Series) . . . See page 50

FOUNDATIONS FOR THE FUTURE (Challenge Series) . . . . . See page 50

THE FUEL OF THE FUTURE (Challenge Series) . . . See page 50

GAUGING THICKNESS WITH RADIOISOTOPES (1958). 4½ minutes, black and white.

Produced by George Tressel Productions, for the USAEC. For sale by Byron Motion Pictures, at $5.47 per print, including shipping case, F.O.B. Washington, D. C.

This technical film, for high school and college-level audiences, shows briefly how beta gauges are used for precise measurement and control

of feed-back apparatus in steel, plastic, rubber, and paper manufacturing.

HARNESSING THE RAINBOW (Challenge Series) . . . See page 50

INDUSTRIAL APPLICATIONS OF RADIOISOTOPES (1961). 57 minutes, color.

Produced for the USAEC by the Army Pictorial Center. For sale by Byron Motion Pictures, at $160.33 per print, including shipping case.

This semitechnical film surveys the current widespread uses of radioisotopes throughout American industry. Three major areas of use are described: nuclear gauging (thickness, density, and level), radiography, and tracing—with various examples of each filmed at 26 sites nationwide, including the rubber industry, thin strip metal production, plastics, paper mills, nylons, food canning, cement, submarine construction, oil industry, automobiles, etc. Covered briefly are luminescence, static elimination, isotopic power, and uses of high-intensity radiation. Basic principles are explained by animation, followed by examples of in-plant uses. Benefits to the consumer and manufacturer are highlighted. The excellent safety record is noted. The film, although of interest to a wide audience, is designed to acquaint industrial management with the versatility, economy, and ease with which radioisotope techniques can be adapted to plant requirements.

THE INDUSTRIAL ATOM (Magic of the Atom Series) . . See page 57

MACHINES THAT THINK (Challenge Series) . . . . See page 51

OPPORTUNITY UNLIMITED: FRIENDLY ATOMS IN INDUSTRY (1962). 28 minutes, color.

Produced by the Army Pictorial Center for USAEC's Division of Isotope Development. For sale by Byron Motion Pictures, at $81.77 per print, including shipping case, F.O.B. Washington, D. C.

This popular-level film, narrated by news commentator John Daly, surveys the widespread use of radioisotopes by American industry to make better products—from ships to nylon hose—more efficiently and with an impressive record of safety. By means of animation and live action, the film explains what radioisotopes are and how they are used to (1) measure and control the thickness of sheet materials, (2) measure densities of materials, (3) control product quality, (4) increase flexibility and mobility of industrial radiography (taking X-ray type pictures to assure safe construction), and (5) act as tracers to follow physical movement and chemical reactions. Examples are given of thickness gauges of nylon cord-rubber ply for automobile tires, sheet

plastic, and cord-rolled alloy sheets for computers and space-age instruments, as well as examples of gauges which measure densities without shutdown (such as gauges that measure sugar content in applesauce, fat content, and moisture content in soil) and which measure the level of liquids in cans. Industrial radiography with radioisotopes is illustrated with the work on submarines. Uses of radioisotope tracers are explained for engine-wear studies, product movement in oil pipelines, leak detection in pipelines, etc.

RADIOISOTOPE APPLICATIONS IN INDUSTRY (Understanding the Atom Series) . . . . . See page 61

RADIOISOTOPES: SAFE SERVANTS OF INDUSTRY (1963). 28 minutes, color.

Produced by Molesworth Associates and Orleans Film Productions for the USAEC's Division of Isotope Development. For sale by Orleans Film Productions, at $88.80 per print, including shipping case, F.O.B. Knoxville, Tenn.

With emphasis on safety, this film surveys the widespread uses of radioisotopes in industry. Animated explanations of the principles involved in radioisotope gauging instruments, tracing and radiography are given. Applications of these principles are shown in various processes in the food industry, automotive research, road construction, heavy industry, oil refining and shipping, and system troubleshooting.

TESTING FOR TOMORROW (Challenge Series) . . . . See page 52

INTERNATIONAL
(Information Exchange and Training)

ATOMS AT WORK: THE LATIN AMERICAN EXHIBIT (1961). 14 minutes, color.

Produced for the USAEC by the U. S. Department of Agriculture Motion Picture Service. For sale by the producer at $64.00 per print, including shipping case.

This film describes the Commission's exhibit on the peaceful uses of atomic energy during the Latin-American tour, including Rio de Janeiro and Buenos Aires. After the opening-day ceremonies, there is a flashback showing the construction of the exhibit structure and facilities (e.g., the concrete foundation, the shield for the nuclear-research training reactor, the erection of steel arches, and the nature and inflation of the air-supported double-domed structure made of vinyl-coated nylon). The film shows the various exhibits and facilities, including the three-screen theater, the nuclear-power exhibit, the

industrial-applications exhibit, the agricultural exhibit, the medical exhibit, the health and safety exhibit, the gamma tank, and the nuclear-research test reactor. (Nontechnical: suitable for all audience levels.)

ATOMS FOR PEACE: GENEVA—1958 (1959). 15 minutes, black and white.

Produced by the USAEC and the U. S. Department of Agriculture Motion Picture Service. For sale by the U. S. Department of Agriculture, at $24.19 per print, including shipping case.

This nontechnical film, for intermediate through college-level audiences, reports on U. S. participation in the Second International Conference on Peaceful Uses of Atomic Energy, held at Geneva in September 1958 under UN auspices and attended by 6000 scientists and technicians of 69 nations and 9 international agencies. It points to the technical papers program and the 722 papers contributed by the United States; provides a quick look at the Atoms For Peace Commercial Exposition held concurrently in Geneva; then devotes coverage to the U. S. Technical Exhibit—made up of 64 sections, many with full-scale scientific devices in operation—which covered four major areas: Physical Sciences, Reactor Sciences and Technology, Life Sciences, and Controlled Thermonuclear Research.

ATOMS FOR THE AMERICAS (1963). 28 minutes, color.

Produced for USAEC's Oak Ridge Operations Office by Orleans Film Productions. For sale by Byron Motion Pictures, at $76.66 per print, including shipping case.

This semitechnical film offers an extensive tour of the facilities of the Puerto Rico Nuclear Center (operated for the USAEC by the University of Puerto Rico) and a study of the Center's curricula and research programs. The Center was conceived primarily to aid the Latin American nations in developing skills essential to nuclear energy activity, by providing graduate- and post graduate-level education and research opportunities. At the Center's Bio-Medical building, work is shown involving radioisotopes and their clinical applications, and other nuclear work related to biology, chemistry, and medicine is reviewed. Study and research in nuclear engineering and technology, health physics, agriculture and marine biology are shown at the Center's reactor and laboratories located on the campus of the University of Puerto Rico's College of Agriculture and Engineering, and aboard the Center's oceanographic ship.

ATOMS ON THE FARM (The USAEC at the World Agricultural Fair, India) (1961). 12 minutes, color.

Produced by, and for sale by, the U. S. Department of Agriculture Motion Picture Service, at $56.00 per print, including shipping case.

This nontechnical film, suitable for all audience levels, summarizes the nature of the USAEC exhibit on atomic energy in agriculture at the first World Agricultural Fair, New Delhi, during the winter 1959–60. Various views show the crowds examining the research reactor, master-slave manipulator, the gamma pool, the technical information center, and exhibits featuring radioactive tracers in agricultural research, plant mutations by gamma irradiation, atomic energy work in medicine, screwworm fly eradication, food sterilization by irradiation, etc.

THE INTERNATIONAL ATOM (1961). 27 minutes, color.

Produced by the United Nations Office of Public Information and the International Atomic Energy Agency, for the UN Visual Information Board. For sale by Contemporary Films at $152.00 per print, including shipping case. NOT cleared for television, except by special permission of the UN Office of Public Information in New York.

This film, which summarizes and explains the peaceful uses of atomic energy, was produced with the assistance of the government atomic energy establishments and private industry of the following countries: the United States, Canada, West Germany, France, India, Japan, Mexico, Netherlands, Norway, Switzerland, the United Kingdom, and the USSR. The film defines fission and chain reaction, introduces the idea of heat generation by a nuclear reactor, mentions the use of nuclear power for ship propulsion, stresses the need for international cooperation in the atomic field, explains what radioisotopes are and how they are packed and shipped, explains how radioisotopes and radiation are used in agriculture (rice fields, fertilizer studies, development of stronger strains of weather- and disease-resistant food crops, eradication of the screwworm fly, etc.).

TRAINING MEN FOR THE ATOMIC AGE (1957). 20 minutes, black and white.

Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

This nontechnical film, for intermediate through college-level audiences, shows young scientists from many nations undergoing training at the International School for Nuclear Science and Engineering at USAEC Argonne National Laboratory near Chicago. It includes examples of preliminary training courses at Pennsylvania State University and the University of North Carolina, and briefly explains the radioisotopes training courses at the Oak Ridge Institute of Nuclear Studies.

WORKING TOGETHER (1957). 20 minutes, black and white.

Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

This nontechnical film, for intermediate through college-level audiences, summarizes regional and international cooperation by scientists and government in advancing peaceful applications of atomic energy. It describes: U. S. shipments abroad of radioisotopes; formation of the European Council for Nuclear Research; former President Dwight D. Eisenhower's "Atoms for Peace" announcement to the UN; first international conference on atomic energy at the University of Michigan; first shipment abroad by U. S. Atomic Energy libraries; UN General Assembly debate on the international agency; the joint Norwegian-Dutch atomic energy laboratory; atomic energy work of India, Brazil and others; U. S. training of foreign scientists; U. S. agreements with other nations for information and materials; Geneva–1955 international conference; the approval of the Charter of the International Atomic Energy Agency.

NUCLEAR PROPULSION

ATOMS FOR PEACE . . . . . See page 36

A DAWN'S EARLY LIGHT . . . . . See page 36

FULL SPEED AHEAD (1958). 15 minutes, color.

Produced for the USAEC and the U. S. Maritime Administration, by, and for sale by, Orleans Film Productions, at $52.50 per print, including shipping case.

A nontechnical film for intermediate through college-level audiences. It depicts the initial stages in the development of the first U. S. nuclear-powered merchant ship, the N.S. *Savannah*. Included are the industrial and technical procedures in building and testing the reactor, surveying harbors, and laying the keel.

THE NEW POWER . . . . . See page 24

THE NUCLEAR SHIP *SAVANNAH* (1964) (Long Documentary Version). 28½ minutes, color.

Produced by Orleans Film Productions for the U. S. Maritime Administration and the USAEC. For sale by DuArt Film Laboratories, at $71.10 per print including shipping case, F.O.B. New York. *Ask for Long Documentary Version.*

This nontechnical, documentary film, for junior-high-school- through college-level audiences, covers the historical background, and the design, construction, sea trials, and initial port calls of the N.S. *Savannah*, the world's first nuclear-powered merchant ship. The film begins with a brief review of America's maritime growth, starting with May 22,

1819, and the story of the S.S. *Savannah*, the first ship to cross the ocean under steam power. The design of the N.S. *Savannah* and its atomic reactor and propulsion system are explained with animation and live action photography. After keel laying, various phases of the ship's construction are covered, and the assembling and testing of the reactor are explained. The ceremonies involving the launching of the ship are shown, followed by impressive scenes showing the loading of the reactor with its nuclear fuel under surgically clean conditions. The special training of the crew is reviewed. The film then shows the sea trials of the ship, during which time the reactor is slowly brought up to full power. After sea trials, the trip of the N.S. *Savannah* to her first port of call, Savannah, Georgia, is covered, followed by her voyage through the Panama Canal and visits to Hawaii and West Coast ports. As the ship leaves for foreign ports, the film ends with a statement by President Lyndon B. Johnson on the significance of the Nuclear Ship *Savannah* as a pioneer in the use of nuclear power for world trade to benefit all mankind.

UNDER WAY (1960). 20 minutes, color.

Produced for the USAEC and the U. S. Maritime Administration, and for sale by, Orleans Film Productions, at $85.00 per print, including shipping case.

This is a nontechnical film for intermediate through college-level audiences. It traces the design and construction of the first U. S. nuclear-powered merchant ship, the N.S. *Savannah;* its hull design and assembly; the design, testing, and fabrication of the nuclear power plant; critical assembly used in core design; fuel element fabrication; erection of the reactor system's containment vessel; safety features; christening and launching.

NUCLEAR REACTORS AND POWER

ARMY PACKAGE POWER REACTOR (1957). 25½ minutes, color.

Produced by the U. S. Army and the USAEC. For sale by Byron Motion Pictures, at $65.67 per print, including shipping case.

For high-school- and college-level audiences, this semitechnical film documents the inception, design, construction, initial operation, and dedication of the APPR-1, a prototype reactor utilizing components all transportable by air. Animation is used to illustrate its operation.

THE ATOM COMES TO TOWN . . . . . See page 35

ATOMIC FURNACES (Challenge Series) . . . . . See page 49

ATOMIC FURNACES (Magic of the Atom Series) . . . See page 55

ATOMIC POWER AND THE UNITED STATES (1959). 25 minutes, black and white.

Produced by the U. S. Information Agency. Available for loan (free) from the USAEC headquarters and field libraries.

This is a nontechnical film for intermediate through college-level audiences. It summarizes activities of both the government and private industry in the program for the development of economic production of electric power with atomic energy. It compares conventional and nuclear approaches, and by animation and live action explains six important nuclear power projects. It outlines industry's contributions and the sharing of technical know-how overseas through the Atoms for Peace Program.

ATOMIC POWER PRODUCTION (Magic of the Atom Series) . . . . . See page 56

ATOMIC VENTURE (1961). 23½ minutes, color.

Produced by, and for sale by, the General Electric Company, at $142.96 per print including shipping case.

This semitechnical film, which is a sequel to the 1958 film "Dresden Nuclear Power Station," covers the design and development of a large dual-cycle boiling-water reactor—the 180,000-kw Dresden Nuclear Power Station—built by General Electric Company (GE) for the Commonwealth Edison Company, Chicago, and the Nuclear Power Group, Inc., and the history of the project from its beginning in 1955 to its completion in 1959. The film shows major stages of development, including clearance of the site 47 miles southwest of Chicago; groundbreaking; construction of foundations, sphere, and other buildings; manufacture of the containment vessel and fuel; shipment and arrival of major components; installation of the reactor core, reactor vessel, and turbine-generator; testing of completed installations; and the station's "going critical." The film also includes scenes relating to development work for Dresden carried out at GE's Vallecitos Atomic Laboratory near Pleasanton, Calif.

ATOMS FOR PEACE . . . . . See page 36

ATOMS FOR SPACE . . . . . See page 2

BORAX: CONSTRUCTION AND OPERATION OF A BOILING WATER REACTOR (1955). 14 minutes, black and white.

Produced by, and for sale by, Lookout Mountain Air Force Station, USAF, at approximately $18.00 per print, including shipping case.

This nontechnical film for intermediate- through college-level audiences, shows the equipping of a reactor with an electrical generating

system, and the operating of the nuclear power plant to light and power Arco, Idaho, the U. S. community first served exclusively by nuclear power, for an hour on July 17, 1955.

BASIC PRINCIPLES OF POWER REACTORS (1962). 8½ minutes, color.

Produced by, and for sale by, Lookout Mountain Air Force Station, USAF, at $39.51 per print, including shipping case.

This film is an excerpt from the 35-min Commission film entitled "The New Power," produced by the USAEC's Idaho Operations Office. This animated film, produced to facilitate the understanding of nuclear-power reactors and how they produce steam for the generation of electricity, briefly describes fission, controlled chain reaction, and the function of basic reactor components (e.g., core, reactor vessel, shielding, moderators, coolants, and control rods). The boiling-water and pressurized-water reactor concepts are explained. Various types of fuel elements are described, such as rods, plates, and pellets. (Nontechnical: suitable for all audience levels above elementary school.)

A BREEDER IN THE DESERT (Challenge Series) . . . See page 49

THE FUEL OF THE FUTURE (Challenge Series) . . . See page 50

HALLAM NUCLEAR POWER FACILITY (1963). 20 minutes, color.

Produced by USAEC's Chicago Operations Office. For sale by the Calvin Productions, at $63.36 per print, including shipping case, F.O.B. Kansas City.

This film shows the setting and location of the reactor built jointly by USAEC and the Consumers' Public Power District of Nebraska. An explanation of this type of reactor, using a liquid metal coolant, is given stressing its advantages. The working of the plant is shown in animation. Live footage shows construction of the reactor containment vessel, its transportation from Philadelphia to Hallam, moderator fabrication and installation, installation and operation of safety rods, use of an intermediate heat exchanger, installation of steam piping and the installation of the turbine and generator. Also shown is fuel handling, cleaning and storage cells, fuel fabrication, and testing.

ML-1 MOBILE NUCLEAR POWER PLANT (1963). 26 minutes, color.

Produced for the U. S. Army and the USAEC (under the technical direction of the Idaho Operations Office) by Lookout Mountain Air Force Station, USAF. For sale by the producer, at $99.15 per single print, including shipping case, F.O.B. Hollywood.

This semitechnical film states the Army's logistical need for mobile power, and shows how that need is partially filled by the design, construction, testing and field operation of a new transportable power re-

actor plant, the ML-1. An explanation of the design of this gas-cooled, water-moderated reactor is given. Development of the reactor at the USAEC's National Reactor Testing Station, Idaho, is shown. The design and testing of the turbomachinery takes place at the Army Engineer Research and Development Laboratory at Ft. Belvoir, Virginia. The film also covers the training of the operating crews, assembly of the ML-1, checkout and test run, testing of the transportability of the system using mock-ups, simulated transportation of the ML-1 to the field and its start-up and criticality.

THE NEW POWER (Revised Version, 1965). 45 minutes, color.

Produced for the USAEC's Idaho Operations Office, and for sale by, Lookout Mountain Air Force Station, USAF, at about $150.00 per print, including shipping case.

This nontechnical film, for all audience levels, tells how the National Reactor Testing Station in Idaho is furthering the USAEC's quest for economic nuclear power. Most of the more than 40 experimental nuclear reactors built, being built, or planned there are described either historically or currently, including the Navy's prototypes for the submarine *Nautilus* and aircraft carrier *Enterprise;* the internationally known testing reactor complex (MTR, ETR, ATR); the Idaho Chemical Processing Plant, the Army's mobile low power nuclear plant (ML-1); and the importance of breeding nuclear fuel as authorized by the two Experimental Breeder Reactor complexes, EBR-I and EBR-II. Also discussed are the USAEC's leading reactor safety programs—SPERT and STEP (Special Power Excursion Reactor Test and Safety Test Engineering Program). The film also explains the basic principles of power reactor construction and operation in an animated sequence that is also available as a separate film titled, "Basic Principles of Power Reactor Operation."

NUCLEAR ENERGY GOES RURAL (1963). 14½ minutes, color.

Produced by USAEC's Chicago Operations Office. For sale by Anthony Lane Studios, at $57.00 per print, including shipping case, F.O.B. Minneapolis.

This film presents the background, planning, and construction of the Elk River Reactor for Minnesota's Rural Cooperative Power Association. After the rural background and setting are established, the planning of the reactor is shown. Animation is used to explain the principle of the boiling water reactor with conventional superheated steam. A comparison is made with the hot air heating system used in the home, and the reactor's control rods are compared with a thermostat. The reactor control room is shown. A "Scram" is explained. Fuel operations are also explained, as well as the air monitoring system.

NUCLEAR REACTORS FOR RESEARCH (1955). 15 minutes, color.

Produced by Atomics International. Not for sale.

This film explains the basic design of the small homogeneous water-boiler reactor type and describes the components and the various steps in the construction of a small homogeneous reactor. Operation of the reactor is described, and research uses are illustrated.

THE PIQUA NUCLEAR POWER FACILITY (1963). 23 minutes, color.
Produced by the USAEC's Chicago Operations Office. For sale by Byron Motion Pictures, at $64.18 per print, including shipping case, F.O.B. Washington, D. C.

The Piqua Nuclear Power Facility is the first municipally owned power plant using steam produced by a USAEC nuclear reactor. This film gives an animated explanation of Piqua's reactor—an organic moderated reactor—and compares it with the liquid metal sodium graphite type reactor at Hallam, Nebraska, and the pressurized water reactor at Shippingport, Pa. Live action footage of the Organic Moderated Reactor Experiment at the National Reactor Test Station in Idaho is shown, as well as of the design and construction of the Piqua facility.

PM-1 NUCLEAR POWER PLANT (1962). 20 minutes, color.
Produced by the Nuclear Division, Martin Company. For sale by the Calvin Productions, at $55.28 per print, including shipping case, F.O.B. Kansas City.

A filmed story of the PM-1 nuclear power plant (a pressurized water system), a joint project of the USAEC and the U. S. Air Force, which supplies the power for the radar and space heating of a remote Air Defense Command radar station in Wyoming. The film breaks down the types and contents of 16 air transportable packages, a total weight of about 30,000 pounds: reactor, steam generator, waste tank, heat-transfer apparatus, control room, turbogenerator, etc. Details are given on major components and the design and operation of the system by information on: 741 nuclear fuel tubes in 7 fuel bundles, the "flow" of primary water, the secondary water, details on the makeup of the fuel element tubes, criticality testing, nature of the control rods, tests to determine heat transfer and flow characteristics. The film recounts the airlift of the packages, erection and assembly of the power plant, the work to achieve criticality, and the varied safety controls.

PM-3A NUCLEAR POWER PLANT—ANTARCTICA (1963). 20 minutes, color.
Produced by the Martin Company for the USAEC. For sale by Byron Motion Pictures, at $64.11 per print, including shipping case, F.O.B. Washington, D. C.

This is the semitechnical film-story of the 1500-kilowatt nuclear power station built, under contract to USAEC, for operation by the Navy at McMurdo Station, Antarctic headquarters for the joint Navy–

National Science Foundation Antarctic Research Project. PM-3A, the first atomic power station in the bleak Antarctic, supplies electric power and space heating for the isolated station. Use of nuclear power reduces the massive amounts of fuel oil for generating electricity that must be brought 11,000 miles by American tankers. PM-3A was designed, fabricated, and tested in 14 months. Details are given on the plant's pressure vessel, coolant, nuclear fuel, control rods, switchgear, heat-transfer equipment, turbogenerator, and many other major components. We see shots of the erection and testing of the reactor in the States, site preparation by Seabees in the Antarctic, erection and testing of the reactor at McMurdo, safety aspects, and achievement of criticality.

POWER AND PROMISE (1959). 29 minutes, color.

Produced by the USAEC. For sale by Consolidated Film Industries, at $99.97 per print, including shipping case.

This is a semitechnical film for high-school- and college-level audiences. It describes the Shippingport Atomic Power Station in Pennsylvania, built to advance power reactor technology and demonstrate the practicability of operating a central station atomic power plant in a utility network. Included is an explanation of the production and control of heat and radioactivity produced by nuclear fission; manufacture of fuel elements; major components such as pumps, heat exchangers, and the pressure vessel; construction of the station; installation of components; and the erection and installation of the reactor core.

POWER UNLIMITED (Magic of the Atom Series) . . . See page 57

PRINCIPLES OF THERMAL, FAST AND BREEDER REACTORS . . . . . See page 9

SNAPSHOT . . . . . See page 7

THE STORY OF CAMP CENTURY: CITY UNDER THE ICE (1961). 32 minutes, color.

Produced by the U. S. Army Pictorial Center. Not for sale. This film concerns the construction by Army Engineers of Camp Century, a nuclear-powered U. S. Army Arctic research laboratory buried below the Greenland ice cap. Although the film tells the entire story of the planning and construction of Camp Century, it contains a significant section devoted to the nuclear power plant for electricity and space heating. The film shows the selection of the isolated camp site, 150 miles from Thule; delivery of supplies and equipment by motorized bobsleds; digging and construction of 23 tunnels in the ice (trenches covered with steel arches and snow); construction of foundations for prefabricated buildings; erection of prefabricated buildings;

procurement of water supplies; installation of insulated piping and sewage lines; and how the men eat and sleep. Also shown are the digging of four deep trenches for the nuclear power plant, the construction of the frame for the reactor buildings, arrival of the power plant (400 tons of piping, machinery, and components) by sea, delivery of the heavy components (including a 21-ton vapor container) by sled over the ice cap, unloading of the power plant, opening of labeled boxes of piping and wiring, reassembly of major components, and movement of the 15-ton condenser into the tunnel. The power plant is described, and the assembly of the shells to contain the nuclear section, the work to activate the power plant, the subcritical tests, the careful loading of the reactor core with fuel elements after inspection and cleaning, the gradual activation of the reactor, and the achievement of criticality are shown. Today, powered by its nuclear reactor, the Arctic research center is in full operation. (Nontechnical: suitable for high school and above.)

TESTING FOR TOMORROW (Challenge Series) . . . See page 52

TOMORROW'S POWER—TODAY (1964). 5½ minutes, color.
Produced for USAEC by Argonne National Laboratory. For sale by Geo. W. Colburn Laboratory, at $15.84 per print, including shipping case, F.O.B. Chicago.

This nontechnical film, for all audience levels, briefly explains the principle of atomic power production, states the need for its continued development while showing that it is already in use in many locations across the country. The film explains why the energy of the atom is needed to supplement that of conventional fossil fuels. Animation is used to explain how nuclear fission creates heat and how that heat is converted to electrical power. A comparison is given between the energy released from the uranium atom and coal, gas, and oil. The film concludes with a brief survey of representative atomic power plants in the United States, noting location and kilowatts of electrical power.

NUCLEAR RESEARCH

THE ALCHEMIST'S DREAM (Challenge Series). . . . See page 49

THE ART OF SEPARATION (Challenge Series) . . . . See page 49

THE ATOM IN PHYSICAL SCIENCE (Understanding the Atom Series) . . . . . See page 58

ATOM SMASHERS (Magic of the Atom Series) . . . . See page 54

ATOMIC ALCHEMIST (Magic of the Atom Series) . . . See page 54

THE ATOMIC FINGERPRINT (Magic of the Atom Series) . . . . . See page 55

ATOMIC FURNACES (Challenge Series) . . . . . See page 49

ATOMIC METALLURGY (Magic of the Atom Series) . . See page 56

ATOMIC RESEARCH: AREAS AND DEVELOPMENT (1953). 12½ minutes, black and white.

Produced by, and for sale by, Coronet Films, at $77.00 per print, including shipping case.

This nontechnical film illustrates three lines of research: energy, atomic structure, and by-products. It shows how reactors harness energy; how science explores the structure and particles of atoms with particle accelerators; and how radioisotopes are employed as tracers for research in biology, medicine, agriculture and industry.

ATOMS FOR THE AMERICAS . . . . . See page 18

BETA RAY SPECTROMETER . . . . . See page 8

A BREEDER IN THE DESERT (Challenge Series) . . . See page 49

A CHEMICAL SOMERSAULT (Challenge Series) . . . See page 50

CLEAN AIR IS A BREEZE (Airborne Contamination Control Through Laminar Air Flow) (1965). 16 minutes, color.

Produced by the Sandia Corporation for the USAEC. For sale by Calvin Productions, at $43.52 per print including shipping case, F.O.B. Kansas City, Mo.

Common sources of airborne contamination are illustrated to show that our world is contaminated by a variety of airborne particles. The difficulties of manufacturing precision devices in such a "dirty" world are shown. The tiny sizes of particles which cause problems in delicate assembly work and critical industrial processes are illustrated through animated photography. Earlier attempts to clean air for industrial processes by means of clean rooms are shown. The reasons for less than complete success with standard clean rooms are explained through animation, and the theory and basic operating principles of laminar airflow systems are shown. The variety of laminar airflow devices (various clean rooms and clean benches) now available is shown. Application of such devices to industrial processes, re-

search and development problems, and to the field of medical care and medical research are illustrated. A short recapitulation points out that laminar flow devices make possible the clean work which must continue in spite of the contamination present in the world.

DOWN ON THE FARM (Challenge Series) . . . . . See page 50

FOUNDATIONS FOR THE FUTURE (Challenge Series) . See page 50

HARNESSING THE RAINBOW (Challenge Series) . . . See page 50

THE HIGH ENERGY PEOPLE (1963). $5\frac{1}{4}$ minutes, color.

Produced by USAEC's Argonne National Laboratory. For sale by Byron Motion Pictures, at $17.30 per print, including shipping case, F.O.B. Washington, D. C.

This film offers a brief description of the problems and tools of high energy physics, illustrated by some of the work being done with Zero Gradient Synchrotron. Scientists and technicians who work with this giant atom smasher describe various phases of their work. Aside from the Synchrotron itself, the Spark Chamber is shown and explained, as are the automatic cameras which photograph the tracks of sub-atomic particles. Examination and analysis of the photographs are also described.

HIGH ENERGY RADIATIONS FOR MANKIND (1958). 16 minutes, color.

Produced by the Public Relations Office, High Voltage Engineering Corporation, Burlington, Mass. For sale by Orleans Film Productions, at $150.00 per print, including shipping case.

This semitechnical film, for high school and college-level audiences, describes the principles, assembly and uses of the Van de Graaff particle accelerator to produce intense, stable, controlled beams of all basic radiation for basic and applied research, industrial processing, chemistry, metallurgy, and biology and medicine. It shows stages of assembly, testing and use of vertical and horizontal machines ranging from 1 to 6 million electron volts; the Microwave Linear Accelerator; and the 10-Mev Tandem Van de Graaff for exploring the binding energy of heavier elements. Examples include use for basic research, nuclear engineering, petrochemistry, drug sterilization, food preservation, radiography, and cancer treatment.

MACHINES THAT THINK (Challenge Series). . . . . See page 51

THE MAGNETIC BOTTLE (1958). 10 minutes, color.

Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

This film is a concise summary, for the informed layman, of the United States Sherwood Program, for research into controlled nuclear fusion. It shows various operating experimental devices, explains their principles and the many complex problems involved in possible future development of full-scale machines to create unlimited industrial power by controlling a continuous fusion process at millions of degrees of temperature.

THE MANY FACES OF ARGONNE (1963). 60 minutes, color.

Produced by USAEC'S Argonne National Laboratory. For sale by Byron Motion Pictures, at $176.10 per print, including double-shipping-case, F.O.B. Washington, D. C. Also available for free loan from Argonne National Laboratory, 9700 South Cass Ave., Argonne, Illinois 60440.

Although the film is about Argonne National Laboratory, it will be useful to both technical and nontechnical audiences who wish an interesting survey of the objectives, methods, and hardware of the broad range of nuclear research conducted by a typical national laboratory of the USAEC.

With both artistry and clarity, the ANL narrator shows the CP-5 and the range of work accomplished with this powerful research reactor. In an ANL chemistry laboratory, investigation of atomic forces with "color center" studies of the structure of crystals is shown. Information is given on methods of protecting atomic scientists from radiation: film badges and dosimeters; the checking of air, water, walls, dust; the remote-control devices involving periscopes and television in order to see and work despite massive shielding.

Argonne's efforts in the power reactor field are summarized, using the Experimental Breeder Reactor II as an example, with detailed explanation of its components, purposes, methods, etc.

Experiments to learn the effects of radiation on human beings are explained—studies of the effects of radiation received continually over a lifetime (bone-tumor studies); studies of the mutation-producing effects of radiation (fruitfly studies, work with dogs, etc.); studies of neonatal rates; life-span studies; studies of leukemia; effects of radiation on cells, etc.

The film shows in detail the giant Zero Gradient Synchrotron accelerator—or "atom-smasher"—used to tear apart subatomic particles to study the basic nature of matter. Argonne's relation to American universities is outlined, with views of the training of foreign students.

METALS FRONTIER (1961). 22 minutes, color.

Produced by Iowa State University Film Production for the Iowa State Institute of Atomic Research and the Ames Laboratory of the USAEC. For sale by Iowa State University, at $75.48 per print, including shipping case.

This semitechnical documentary film, a story of teamwork in research, is designed for an audience with an appreciable degree of scientific sophistication, primarily seniors and graduate students in the physical sciences and engineering. Highlights in the operations of the Ames Laboratory, a major installation of the USAEC, are shown by illustrating the steps in the development of the process for the production of yttrium metal. The film also gives insight into the facilities and the pioneering tradition of Ames Laboratory in the investigation of the rare earths. The film is panoramic in style, showing how basic research, development, and production go along together. The following steps in metal processing are shown: separation of yttrium from rare earths, conversion to fluoride, reduction, and arc melting. Special emphasis is given to purity and to the need for careful analytical control. The film also shows how the graduate student fits into the laboratory's research program.

MICROSCOPE FOR THE UNKNOWN (Challenge Series) . . . . . See page 51

OF MAN AND MATTER (1963). 29 minutes, color.

Produced by USAEC's Brookhaven Laboratory. For sale by B & O Film Specialists, at $110.00 per print, including shipping case, F.O.B. New York City.

This film describes the design, development and operation of the alternating gradient synchrotron (AGS) at Brookhaven National Laboratory, shows the various major components of this 33 billion-electron-volt particle accelerator, and explains how the high energy protons produced in the machine are used in physical research. An actual experiment is seen, in which the particle beam is guided into a bubble chamber and the resultant interactions with the target nuclei are photographed. The methods adopted in scanning and analyzing the photographs are also shown. By means of a brief lecture, a Brookhaven physicist explains that such gigantic and complex machines as the AGS are necessary in order to study the fundamental particles and the forces within the atomic nucleus that are the basic components of all existing matter.

SEARCHING FOR THE ULTIMATE (Challenge Series) . . . . . See page 52

TESTING FOR TOMORROW (Challenge Series) . . . See page 52

WORKING WITH RADIATION (Challenge Series) . . . See page 53

THE WORLDS WITHIN (1963). 29 minutes, color.

Produced by Stanford University. For sale by Filmservice Laboratories, at $65.25 per print, including shipping case.

This nontechnical film, for high school through college-level audiences, describes the design, construction and use of SLAC, the new Stanford Linear Accelerator. A comparison is made of the various methods man uses to "see" particles of smaller and smaller dimension—using the magnifying glass, the microscope, the electron microscope, and the electron linear accelerator. Some historical background is given on the development of the linear accelerator. Scientists and engineers involved in the SLAC project discuss the theory of its operation and some of the problems related to building and operating this huge instrument to explore the structure of the atom and discover new particles. The fabrication of the 2-mile long copper tube, with a bore of only one inch in diameter, through which atomic particles will be fired, is shown and explained in some detail. The high power radio tubes, called klystrons, which are used to project electrons down the tube at tremendous velocities, are shown being fabricated, set into the accelerator, and tested. The plans and construction of the housing of SLAC are shown and discussed from both the architectural and safety standpoints.

NUCLEAR WEAPONS AND TESTING

ATOMIC TESTS IN NEVADA (1955). 25 minutes, color.

Produced for the USAEC, and for sale by, Lookout Mountain Air Force Station, USAF, at $130.00 per color print from original, and $30.00 for black and white print; or Byron Motion Pictures, at $70.00 per color print from master, and $24.00 per black and white print.

This nontechnical film for all audience levels explains the reasons (in 1955) for continental testing of nuclear weapons and describes testing procedures at the USAEC Nevada Test Site, with detailed information on measures taken to protect the public.

BIKINI RADIOBIOLOGICAL LABORATORY . . . . . See page 11

ENVIRONMENTAL TESTING AT SANDIA (1964). 28 minutes, color.

Produced by the Sandia Corporation for the USAEC. For sale by Calvin Productions, at $73.07 per print including shipping case, F.O.B. Kansas City, Mo.

This semitechnical motion picture discusses the environments, both natural and induced, which weapon components and systems may experience between manufacture and use. The film shows how environmental testing is used to ensure reliability. A series of test sequences enables the audience to see some of the facilities at USAEC's Sandia Laboratory—giant centrifuge, electrodynamic shaker, rocker sled, air

gun, climatic chamber, etc.—which are used to produce varying environments. The film will be of interest to military and civilian engineers, as well as scientists and technicians associated with the weapons program. It will also be of interest to general nontechnical audiences of high school level and above.

GROUP SHELTER (1960). 10 minutes, color.

Produced for the USAEC, and for sale by, the U. S. Department of Agriculture Motion Picture Service, at $40.00 per print, including shipping case.

A film of interest to both technical and nontechnical personnel concerned with the protection of large groups from the effects of nuclear weapons. It describes an underground corrugated-metal arch shelter design for the protection of 100 persons for two weeks or more. A model shows the above-ground entryway and below-ground compartments for sleeping, living, services, and utilities. The design is based on experience gained during 1957 effects tests at the Nevada Test Site and subsequent engineering studies, and is described in detail in Civil Effects Test Operations Report "CEX 58.7 AEC Group Shelter."

OFFSITE MONITORING OF FALLOUT FROM NUCLEAR TESTS (1958). 29 minutes, color.

Produced by the U. S. Public Health Service. For sale by DuArt Film Laboratories, at $116.11 per print, including shipping case. Also available for loan from the U. S. Public Health Service, Audio-Visual Facility, Communicable Disease Center, Atlanta, Ga. 30322.

This technical film, for high school and college-level audiences, explains radiological safety activities of the U. S. Public Health Service in the area surrounding the Nevada Test Site. It describes the training of PHS Commissioned Reservists from state health departments, universities, and industry; monitoring and public information responsibilities of PHS zone commanders; methods of collection and laboratory analysis of environmental samples.

OPERATION CROSSROADS (1948). 27 minutes, color.

Produced by the U. S. Navy. For sale by DuArt Film Laboratories, at $85.98 per print.

This nontechnical film, for intermediate through college-level audiences, documents the 1946 effects tests at Bikini Atoll.

OPERATION GREENHOUSE (1952). 25 minutes, color.

Produced by the USAEC and the Lookout Mountain Air Force Station, USAF. For sale by DuArt Film Laboratories, at $79.67 per print.

This nontechnical film, for intermediate through college-level audiences, describes joint USAEC and Department of Defense scientific and technical operations during proof-testing of weapons at the USAEC Pacific Proving Grounds during spring 1951. It shows the effects of blast and heat on structures, aircraft, and various other items used by the Department of Defense and Federal Civil Defense Administration.

OPERATION IVY (1954). 28 minutes, color.

Produced for the Office of Civil Defense and USAEC, and for sale by, the Lookout Mountain Air Force Station, USAF, at $128.81 per print.

This nontechnical film, for intermediate through college-level audiences, documents the "Mike" thermonuclear test at the USAEC Pacific Proving Grounds in 1952. It includes introductory remarks by former President Dwight D. Eisenhower.

OPERATION SANDSTONE (1950). 18 minutes, color.

Produced for the USAEC by Lookout Mountain Air Force Station, USAF. For sale by DuArt Film Laboratories, at $57.58 per print.

This nontechnical film, for intermediate through college-level audiences, explains the intricate and extensive preparations for the first USAEC developmental test at the Pacific Proving Grounds during spring 1948. The three test detonations are also shown.

RADIATION SAFETY IN NUCLEAR ENERGY EXPLORATIONS . . . . . See page 45

TALE OF TWO CITIES (1947). 14 minutes, black and white.

Produced by the U. S. Army. For sale by DuArt Film Laboratories, at $16.00 per print. Also available from the Signal Officers of: First Army, Governors Island, New York, N. Y. 10004; Second Army, Fort George Meade, Md. 20755; Third Army, Fort McPherson, Ga. 30330; Fourth Army, San Antonio, Texas 76841; Fifth Army, Chicago, Ill. 60035; Sixth Army, San Francisco, Calif. 94118.

This nontechnical film, for intermediate through college-level audiences, shows the destructive results of atomic bombings of Hiroshima and Nagasaki, with close-ups of effects on buildings and materials.

TARGET NEVADA (1953). 16 minutes, color.

Produced by the Lookout Mountain Air Force Station, USAF. For sale by DuArt Film Laboratories, at $44.87 per print.

This nontechnical film, for all audience levels, describes Air Force interest and participation in tests at the USAEC Nevada Test Site.

PEACEFUL USES (Summary Films)

A IS FOR ATOM . . . . . See page 7

AGRICULTURE, INDUSTRY, AND POWER (1955). 20 minutes, black and white.

Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

This nontechnical film, for all audience levels, explains the use of radiation to develop better crop plants, use of radioactive tracers to study fertilizer uptake in plants and food element uptake in animals. It shows industrial radiography, engine wear studies, and petroleum research using radiation, and illustrates the nature of nuclear reactors and their use to produce heat for power.

THE ATOM AND YOU (1953). 16 minutes, black and white.

Produced by, and for sale by, Paramount Pictures Corporation, at $55.75 per print, including shipping case.

This nontechnical film, for all audience levels, consolidates three newsreels covering the use of radioisotopes in biology, medicine, agriculture, and industry, and also the development of atomic power.

THE ATOM COMES TO TOWN (1957). 29 minutes, color.

Produced by, and for sale by, the Chamber of Commerce of the United States, at $160.00 per print, including shipping case.

This nontechnical film, for all audience levels, surveys the entire range of the peacetime uses of atomic energy. It illustrates principles and examples of nuclear power plants, and production and use of radioisotopes in medicine, agriculture and industry.

ATOMIC ENERGY AS A FORCE FOR GOOD (1955). 25 minutes, black and white.

Produced by The Christophers, New York. Available for loan (free) from USAEC headquarters and field libraries.

This is a theatrical feature, for all audience levels, which tells how a small town reacts to the impending construction of an atomic energy plant, and how understanding by the citizenry of the peacetime applications of atomic energy influences their attitude.

ATOMIC ENERGY CAN BE A BLESSING (1953). 25 minutes, black and white.

Produced by The Christophers, New York. Available for loan (free) from USAEC headquarters and field libraries.

This nontechnical film, for all audience levels, covers peaceful uses and research, and emphasizes career opportunities in the atomic energy field.

ATOMS FOR PEACE (1955). 17 minutes, black and white.

Produced by the U. S. Information Agency and the USAEC. Not for sale.

This nontechnical film, for all audience levels, ties together film footage from various sources to cover the entire range of peaceful applications of atomic energy in industry, biology, medicine, and agriculture. It outlines the potential of nuclear power.

A DAWN'S EARLY LIGHT (1955). 40 minutes, color.

Produced by Westinghouse Electric Corp. For sale by Roland Reed Productions, at $211.46 per print, including shipping case. NOT cleared for television.

In this nontechnical film, for all audience levels, Fred McMurray, playing a nuclear scientist, explains to his teen-age son, concerned over the destructive uses of the atom, the various peaceful applications of atomic energy. It also contains a section describing the development of nuclear power for submarine propulsion.

FOUNDATIONS FOR THE FUTURE (Challenge Series) . . . . . See page 50

MAN AND RADIATION (1963). 28½ minutes, color.

Produced for the USAEC by the Army Pictorial Center under the supervision of the USAEC's Division of Isotopes Development. For sale by Calvin Productions, at $77.99 per print, including shipping case, F.O.B. Kansas City, Missouri.

This popular-level film, suitable for audiences from junior high school through college, discusses many aspects of radiation and offers a survey of their widespread beneficial applications in medicine, industry, agriculture, power, and research. A historical survey of the discovery of radiation is followed by an animated explanation of different types of radiation, including alpha, beta, and gamma. A brief explanation of radioisotopes and how they are produced is given, followed by scenes depicting some of their uses, including the use of Calcium-47 to diagnose bone cancer. The detection and study of radiation by sensitive instruments is explained. The study of radiation in the laboratory is demonstrated with work in photosynthesis using radiochromatography. Several important industrial uses of radiation are shown. The use of irradiation for prolonged food preservation, particularly of such highly perishable food as fresh fish, is demonstrated. The production of a new material, a wood-plastic alloy, is also shown as one example of current research in the beneficial uses of radiation.

MAN AND THE ATOM (1965). 59 minutes, color.

Produced by National Educational Television, Inc. with the technical assistance of the USAEC. For sale by DuArt Film Labora-

tories, at $146.62 per print, including shipping case, F.O.B. New York City. Cleared for non-sponsored commercial television. Educational TV stations obtain film directly from NET Film Service, Ann Arbor, Michigan.

Designed for high school through college-level audiences, this film surveys the role of the USAEC in guiding and supporting the nation's atomic energy programs. It reviews many of those programs, including both the peaceful applications of nuclear energy and those involved in national defense.

The film opens with a visit to the community of Buchanan, New York, site of Consolidated Edison's Indian Point atomic power station. The enlightened attitude of the community toward the atomic plant is revealed as the camera visits the mayor of the town, teachers and school children, housewives, businessmen and plant personnel. Following a review of the atom's place in national defense, the film goes into the mining of uranium and processing into fissionable materials.

It then explores the broad role of the USAEC, briefly discussing the make-up of the Commission and showing an actual Commission meeting in session, as the Commissioners, General Manager and Director of Regulation engage in an important discussion involving aerospace safety. The USAEC's responsibility in all facets of atomic safety is covered as the film shows the testing of a nuclear power source for a space satellite and the design and testing of a power reactor. The processing and storage of radioactive waste is discussed.

After reviewing some aspects of the peaceful uses of nuclear explosives, including Projects Sedan and Gnome, the film next turns to a survey of radioisotopes and their many applications. Isotope production at Oak Ridge is shown. Some of the uses of radioisotopes in medicine are demonstrated at the hospital at USAEC's Brookhaven National Laboratory. Some agricultural applications of radioisotopes are shown, including the irradiation of the screwworm fly and the use of radiation for food preservation.

The radioisotope as a source of power is covered during a brief review of the SNAP (Systems for Nuclear Auxiliary Power) program. After a visit to Brookhaven National Laboratory to explore some aspects of high energy physics at the Alternating Gradient Synchrotron, the film concludes with some statements by Dr. Glenn T. Seaborg, Chairman of the USAEC, concerning the important future of the nation's atomic energy program and the role the atom will play in benefiting all mankind.

THE PETRIFIED RIVER . . . . . See page 48

PROJECT DUGOUT (1964). 8½ minutes, color.

Produced by the USAEC's Lawrence Radiation Laboratory at the University of California. For sale by W. A. Palmer Films,

at $53.52 per print, including shipping case, F.O.B. San Francisco. Also available for free loan from the Graphic Arts Department, Lawrence Radiation Laboratory, P. O. Box 808, Livermore.

This semitechnical film reports on Project Dugout, a chemical high explosive experiment conducted June 24, 1964, at the Nevada Test Site in the Commission's Plowshare program. The experiment involved the simultaneous detonation of five 20-ton charges of nitromethane emplaced underground in a row. The principal purpose of the experiment was to advance fundamental knowledge of nuclear excavation technology and row cratering effects in a hard rock medium. The film describes the purpose and objectives of the experiment, previous work with single-charge underground explosions, preparations for the detonation, the detonation and resulting row crater. The moment of detonation is shown in regular and slow motion and from several vantage points.

PROJECT SHOAL (1964). 17½ minutes, color.

Produced by USAEC's Nevada Operations Office for the USAEC and the Department of Defense. For sale by Consolidated Film Industries, at $52.90 per print, including shipping case, F.O.B. Hollywood.

This film, suitable for high school through college-level audiences, describes the preparation for, and firing of, an underground nuclear detonation, one of a planned series of experiments in a Department of Defense research program conducted with USAEC participation. The purpose of the experiments is to improve means of detecting, locating, and identifying underground nuclear explosions. The Project Shoal detonation on October 26, 1963, with an explosive force equal to about 12,000 tons of TNT, was intentionally located in an area subject to natural earthquakes, 28 miles from Fallon, Nevada, to gain information to help distinguish between earthquakes and underground tests. Technical direction for Shoal was by the Sandia Laboratory under the overall management of the USAEC's Nevada Operations Office. The film describes: selection of the site, pre-shot preparations—including a comprehensive program to ensure public safety and to inform the citizens of Fallon of the proposed shot—various citizens' and city officials' reactions to the test, the seismic station program, instrumentation, and the detonation and some of its valuable results.

SCIENTIFIC ADVANCEMENT (1957). 20 minutes, color.

Produced by the U. S. Information Agency. Available for loan (free) from USAEC headquarters and field libraries.

This nontechnical film, for all audience levels, describes the use of atomic energy for electrical power production; the use of radiation in plant breeding experiments; the study of food preservation by irradia-

tion; the use of radioisotopes in industry for thickness gauging of sheet materials, and in medicine for cancer diagnosis and therapy. It shows medical reactors and explains photosynthesis research.

FUELS AND PROCESSING

THE ALCHEMIST'S DREAM (Challenge Series). . . . See page 49

INDUSTRIAL APPLICATIONS OF NUCLEAR EXPLOSIVES (1958). 11 minutes, color.

Produced by the USAEC's Lawrence Radiation Laboratory at the University of California. For sale by Byron Motion Pictures, at $34.54 per print, including shipping case, F.O.B. Washington, D. C.

This semitechnical film, for intermediate through college-level audiences, presents potential industrial applications of nuclear explosives. It suggests that nuclear explosives can be used as safely as chemical explosives, but with greater effect and less cost. Examples include harbor development, economical recovery of low-grade ore bodies, release of petroleum from oil shale, underground production of steam to generate power, and development of large underground reservoirs in arid areas.

PROJECT GNOME (1963). 29 minutes, color.

Produced by USAEC's Lawrence Radiation Laboratory at the University of California. For sale by W. A. Palmer Films, at $139.83 per print, including shipping case, F.O.B. San Francisco.

This film covers Project Gnome—the first nuclear detonation conducted under the USAEC's Plowshare Program for development of peaceful uses of nuclear explosives—from its planning stage through the early months of the post-detonation period when scientists entered the man-created cavern. Project Gnome was an experiment under the technical direction of the Lawrence Radiation Laboratory involving the detonation on December 10, 1961, of a 3.1 kiloton nuclear explosive in a chamber about 1200 feet below the earth's surface in the Salado Salt Basin, a thick subsurface salt bed about 25 miles southeast of Carlsbad, New Mexico. The force of the explosion created an underground cavern which today measures about 170 feet across and almost 90 feet high. Animation is used to explain the scope of Project Gnome and its integrated scientific and technical programs. Project Gnome, one of the most heavily instrumented nuclear detonations ever conducted, was designed to provide scientific and technical information on

five objectives: (1) To determine characteristics and physical effects of underground detonations in a salt medium; (2) to explore feasibility of converting energy produced into electricity; (3) to make neutron cross-measurements which would contribute to scientific knowledge; (4) to provide information on design of nuclear explosives for peaceful purposes; and, (5) to investigate the practicability of recovering useful radioisotopes. Topics covered: geological and safety considerations explored in selection of the Gnome site; drilling and construction of the shaft, underground access tunnel and shot chamber; the surface installations; special monitoring and other programs conducted to afford safety to the public; the seismic and radiological monitoring programs; principal equipment and instrumentation installation in support of the complex scientific experiments; the pre-shot news media tour; the surface movement above ground zero at the moment of detonation; the escape of vapor from the shaft; recovery of scientific data and equipment; and entry into the underground cavity in May 1962. Dr. Edward Teller, University of California nuclear physicist, discusses the objectives of the Plowshare Program and the preliminary results of Project Gnome in the opening and closing scenes.

PROJECT SEDAN (1962). 8 minutes, color.

Produced for the USAEC's Lawrence Radiation Laboratory at the University of California. For sale by W. A. Palmer Films, at $39.10 per print, including shipping case.

This semitechnical motion picture reports on the July 6, 1962, nuclear cratering detonation at the Nevada Test Site. This was the first of a series of experiments under the U. S. Atomic Energy Commission's Plowshare Program to determine the feasibility of nuclear excavations. The specific objective was to determine the cratering of radioactivity entrapment effects of detonating a 100-kiloton nuclear device buried 635 feet in desert alluvium. The film discusses the relationships between depth of explosion and crater size, and depth of explosion and containment of radioactivity. It shows the location, slow-motion shots of the detonation, the area covered by the base surge, the crater (1200 feet in diameter, 320 feet in depth), the fallout pattern, and relates the experiment to possible large-scale excavation projects such as harbors and canals.

RADIOISOTOPES—PRODUCTION AND HANDLING

THE ART OF SEPARATION (Challenge Series) . . . . See page 49

THE ATOMIC PHARMACY (Magic of the Atom Series) . . See page 56

ENGINEERING FOR RADIOISOTOPES (1951). 21½ minutes, black and white.

Produced by USAEC's Oak Ridge National Laboratory. Not for sale.

This film, for high school and college-level audiences, describes the chemical, mechanical, electrical and construction engineering skills required to produce and process radioisotopes on an efficient, industrial basis.

ISOTOPES (1959). 20 minutes, color.

Produced by USAEC's Oak Ridge National Laboratory. For sale by Capital Film Laboratories, at $76.85 per print, including shipping case.

This semitechnical film explains radioactivity, half life, and the three methods of producing radioisotopes. Live photography and animation depict radioisotopes production at Oak Ridge National Laboratory. The film describes in detail the large-scale separation of long-life fission products from waste derived from processing of spent reactor fuels.

TAGGING THE ATOM (Magic of the Atom Series) . . . See page 58

TRACING LIVING CELLS (Challenge Series) . . . . See page 52

SAFETY, WASTE DISPOSAL, AND RADIATION HAZARDS

THE ATOM AND THE WEATHER (Magic of the Atom Series) . . . . . See page 53

ATOMIC CITIES (Magic of the Atom Series) . . . . . See page 54

ATOMIC DETECTIVE (Magic of the Atom Series) . . . See page 55

EXPERIMENTS IN CONTROLLING BRUSH FIRES WITH DETERGENT FOAM (1965). 6½ minutes, color.

Produced by USAEC's Argonne National Laboratory. For sale by Color Service at $14.79 per print, including shipping case, F.O.B. New York. Also available for free loan from field libraries and Argonne National Laboratory, 9700 South Cass Ave., Argonne, Illinois. Cleared for television.

Grass, brush, and forest fires cause an annual loss in the United States close to a quarter billion dollars. This film describes a series of tests by Argonne National Laboratory to explore the use of detergent foam as a fire break. Experiments were conducted with the Fire Protection

Department's forestry jeep, which has a 265-gallon water tank and rotary gear pump. A detergent and water solution is sprayed on a nylon mesh while air is forced through the openings in the mesh by a large fan. This produces a detergent foam which has been expanded approximately 1000 times. The foam is delivered through a canvas tube at the rate of 5000 cubic feet of foam per minute. In three tests detergent foam appeared to be effective.

FIRE FIGHTING IN THE NUCLEAR AGE (1960). 14 minutes, color.
Produced for the USAEC by the Office of Information, Idaho Operations Office, USAEC, and Calvin Productions. For sale by the Calvin Productions, at $68.50 per print, including shipping case, F.O.B. Kansas City, Mo.

This film (produced primarily for fire departments, health officials, and industrial personnel, under the supervision of the Health and Safety Division of the Idaho Operations Office) points out that radiation is just another hazard in fire fighting which can be handled with proper training. The film uses the USAEC Fire Department at the National Reactor Testing Station in Idaho as the example, showing its training. Techniques and procedures are illustrated in the fighting of a mock fire created for this film: A constant air monitor automatically rings the alarm when the fire reaches stored radioactive materials and radiation is released; the fire headquarters check the building inspection report to find out where radioactive materials are stored in the burning building; fire trucks approach the building upwind to avoid possible airborne radiation; firemen don special protective clothing (i.e., shoe covers, gloves, and self-contained respiratory masks) in addition to standard protective gear; the entrance-way to the burning building is monitored before firemen enter, and frequent radiation checks are made during the fire-fighting period; firemen observe time-distance-shielding plan to protect themselves (remain in radiation area shortest possible time, stay as far away from burning radioactive materials as possible, place available shielding material between themselves and the fire); each fireman is checked with a monitor as he leaves the fire; all protective clothing is removed and stacked for monitoring and decontamination; each man checks his film dosimeter to see if he was exposed to radiation; fire-fighting equipment is checked for contamination; personnel are rechecked for radiation after removal of protective gear; film badges are checked; and all personnel scrub down.

THE FUEL OF THE FUTURE (Challenge Series) . . . See page 50

HANDLE WITH CARE: THE SAFE HANDLING OF RADIOISOTOPES, PART 1. (1963). 21½ minutes, black and white.
Produced for the International Atomic Energy Agency. Produced

by, and for sale by, the National Film Board of Canada, at $90.00 per print, without shipping case, F.O.B. New York. NOT cleared for television.

This semitechnical training film, for audiences of high school level and above, covers some of the methods of safe handling of radioisotopes in a laboratory and points out the procedures followed by laboratory personnel to avoid contamination. While the film is instructional in nature, its content is presented in the form of a story of an unlikely, but possible, contamination incident. Told via the flashback technique, the story involves the happenings of one afternoon in a laboratory as a scientist goes about his work in an apparently methodical and routine manner. As he recalls the happenings of the day, the audience sees in detail all the procedures used in the safe handling of radioisotopes. The mystery of the contamination is solved at the end of the film. The film shows the use of protective clothing, radiation measuring devices such as film badges, dosimeters and counters, the handling of the radioisotopes in an experiment using a fume hood, and clean-up procedures following an experiment.

LIVING WITH A GLOVED BOX (1964). 15 minutes, color.

Produced by the USAEC's Lawrence Radiation Laboratory at the University of California. For sale by W. A. Palmer Films, at $66.02 per print, including shipping case, F.O.B. San Francisco. Also available for free loan from USAEC headquarters and field libraries, as well as the Graphic Arts Dept., Lawrence Radiation Laboratory, P. O. Box 808, Livermore, Calif.

This semitechnical film explains the principles and techniques of working with a gloved box—an enclosure designed for handling radioactive materials of low activity which present a hazard primarily through inhalation and ingestion. The film opens with an explanation of how air currents and turbulences carry various substances, some of which may be hazardous. It shows why highly toxic materials like plutonium can best be handled in a gloved box. The principles of the gloved box are then explained in detail. Such items are covered as: the air flow and pressures within the box; the "bagging in" and "bagging out" of materials; the procedures for changing gloves on the box; the changing of the filter, and a method for handling a fire within the box.

LIVING WITH RADIATION (1958). 28 minutes, color.

Produced for the USAEC's Idaho Operations Office by Lookout Mountain Air Force Station. Prints available (from master) from Byron Motion Pictures, at $92.59 per print, including shipping case, F.O.B. Washington, D. C. Prints available (from original) from Lookout Mountain Air Force Station, USAF, at $172.40 per print.

This semitechnical film, for intermediate through college-level audiences, documents in detail the radiation-safety program of the U. S.

atomic energy program, using procedures at the National Reactor Testing Station in Idaho as typical, illustrative examples. It explains: separation-distance factor; storage and/or disposal of radioactive waste; protection of populations, water, crops, and livestock by monitoring of air and environment; and protection of workers by film badges, protective clothing, shielding, remote-control devices, radiation counters, decontamination procedures, and bio-medical studies.

LIVING WITH THE ATOM (1960). 18 minutes, color.

Produced by the U. S. Information Agency.

This nontechnical film, for intermediate through college-level audiences, explains the radiation safety devices and procedures used to protect workers in the atomic industry, which is among the safest of U. S. heavy industries. Through the viewpoint of a community representative talking with the health physicist of a nearby atomic installation, the film also details the precaution taken for the protection of the communities.

THE MASTER SLAVE (Magic of the Atom Series) . . . See page 57

PRIMER ON MONITORING (1953). 30 minutes, color.

Produced by the Film Department of the University of California at Los Angeles. For sale by Consolidated Film Industries, at $131.00 per print, including shipping case.

This semitechnical film, for high school and college-level audiences, describes the different types of radiation, various devices for monitoring each type, and the basic principles of health monitoring procedures.

PROTECTING THE ATOMIC WORKER (Magic of the Atom Series) . . . . . See page 57

RADIATION AND THE POPULATION (Challenge Series). . . . . See page 51

RADIATION DETECTION BY IONIZATION (Understanding the Atom Series) . . . . . See page 60

RADIATION DETECTION BY SCINTILLATION (Understanding the Atom Series) . . . . . See page 61

RADIATION IN PERSPECTIVE (1963). 43 minutes, color.

Produced for the USAEC under the supervision of the Division of Operational Safety, and for sale by U. S. Department of Agriculture Motion Picture Service, at $194.00 per print, including shipping case.

The film, in the form of a lecture by Commission Safety Engineer Francis L. Brannigan, presents the salient points of an approach to the

understanding of the radiation problem which has been found useful for persons requiring a layman's understanding of the nature of radiation—such as teachers groups, public safety officials, transportation executives, insurance executives, service clubs, colleges, and universities, etc. The film will also be useful to those technically qualified, since it demonstrates proven techniques for explaining the radiation hazard to the layman. Since it is basic to the acceptance of any hazard that we expect to get some benefit from it, the lecture-film briefly summarizes some of the beneficial uses of radioactive materials—in medicine, agriculture, industry, systems for nuclear auxiliary power, food sterilization—that justify acceptance of the hazard. The lecturer then explains briefly the internal radiation problem, and in detail the external radiation problem. Information is given on ionization, background levels of radiation, the roentgen, the various radiation levels required to produce immediate injury and low-level radiation exposures over long periods of time. The lecturer discusses the somatic effects (on the individual) and genetic effects (on future generations), and makes a comparison of the acceptable-versus-dangerous levels for radiation with that of the levels for carbon monoxide, to show the conservative nature of radiation regulations. An explanation is given of time, distance and shielding and how they are used to control external radiation exposure. The lecturer points out that the question is not radiation versus no radiation, but rather how much more radiation exposure people can accept consistent with the other hazards of our environment—all balanced against the tremendous industrial, medical, and research benefits of the nuclear age. He summarizes and concludes: "Radiation is another of the hazards with which we must deal as we make progress in our industrial age. Radiation energy in quantity can damage living tissue. However, within limits we can live with this problem so that we can obtain the benefits of the atomic age. This parallels our acceptance of other hazards. There is a tremendous spread between the routinely acceptable operating radiation levels and the dangerous levels—many thousands of times greater than the corresponding spread for other hazards. All radiation contributes to but is not the sole cause of mankind's genetic problems. The proportion due to atomic energy is very small. The conclusion is clear: we can enjoy the benefits of the nuclear age with safety to employees and the public."

RADIATION PROTECTION IN NUCLEAR MEDICINE . . See page 12

RADIATION SAFETY IN NUCLEAR ENERGY EXPLORATIONS (1962). 24 minutes, color.

Produced by the Communicable Disease Center, U. S. Public Health Service, for the Division of Radiological Health, U. S. Public Health Service, in cooperation with the USAEC's Albu-

querque Operations Office. For sale by Byron Motion Pictures, at $100.49 per print, including shipping case. Also available for free loan from the Audio-Visual Section, Communicable Disease Center, USPHS, Atlanta, Ga. 30322.

This film describes radiation-safety activities of the U. S. Public Health Service (USPHS) Division of Radiological Health in the environmental surveillance of radiation and the protection of public health during certain USAEC nuclear-energy experiments on the peaceful uses of atomic energy [nuclear explosives (Operation PLOWSHARE), aerospace program, and seismic research in the detection of underground nuclear detonations]. A brief review of major accomplishments in medical, industrial power and propulsion, and agricultural research applications of nuclear energy is presented, together with a summary of areas of further experimentation in the peaceful applications of atomic energy. These include experiments in the underground storage and recovery of heat, the economic feasibility of using nuclear explosives for excavation and earth-moving operations, the potential for producing isotopes underground, and the development of a nuclear-powered rocket and ram-jet engine. The USPHS radiological health-safety program provides assurance that the health and safety of the public are protected during the operational phases of these nuclear-energy explorations. It includes the collection and laboratory analyses of air, water, milk, and food samples; ground and aerial monitoring with Geiger counters and continuous recorders; a film-badge program to measure accumulated gamma exposure, if any; use of fallout trays; liaison with state health agencies; a public information program; a veterinary program and animal studies; epidemiological studies to evaluate the dose-effect relations of radiation; and a medical liaison officer network for consultation with local physicians and medical societies. Also featured are the cooperative efforts of the USAEC, USPHS, Weather Bureau, U. S. Coast and Geodetic Survey, U. S. Geological Survey, Bureau of Mines, and the Department of Defense in program implementation and the federal-state complex of health agencies to ensure the protection of public health and safety during the experiments. (Nontechnical: suitable for all audience levels.)

RADIOISOTOPES: SAFE SERVANTS OF INDUSTRY . . See page 17

RADIOLOGICAL SAFETY (Understanding the Atom Series) . . . . . See page 63

THE REGULATION OF ATOMIC RADIATION (1963). 28½ minutes, color.

Produced by the USAEC. For sale by Byron Motion Pictures, at $105.73 per print, including shipping case, F.O.B. Washington, D. C.

This film surveys the work of USAEC's Division of Licensing and Regulation, Compliance, and Radiation Protection Standards in licensing and regulating the uses of nuclear materials so that the many benefits of atomic energy and man-made radiation can be achieved in safety. It details how the USAEC effectively controls radiation from radioactive materials and radiation-producing sources during their handling, shipment, and many uses in power, research, industry, agriculture and medicine. The close control of radioactive materials is shown, from the time they leave the mines to be processed until they are once again returned to the earth or the sea as waste materials.

TRACING AIRBORNE RADIOACTIVITY (Challenge Series) . . . . . See page 52

WORKING WITH RADIATION (Challenge Series) . . . See page 53

URANIUM PROSPECTING, MINING, AND PRODUCTION

ATOMIC GOLD RUSH (Magic of the Atom Series) . . . See page 55

BUILDING FOR ATOMIC ENERGY (1958). 21 minutes, color.
Produced by USAEC's Savannah River Operations Office. For sale by the Calvin Productions at $71.00 per print, including shipping case.

This semitechnical film, for high school and college-level audiences, documents the construction of the Savannah River Plant, the largest single construction project ever undertaken by the USAEC.

GASEOUS DIFFUSION (1958). 3 minutes, black and white.
Produced by, and for sale by, Lookout Mountain Air Force Station, USAF, at $6.00 per print, including shipping case.

This nontechnical animation-film illustrates the gaseous diffusion method for separating Uranium-235 from Uranium-238, as accomplished at U. S. Atomic Energy Commission gaseous diffusion plants at Portsmouth, Ohio; Oak Ridge, Tennessee; and Paducah, Kentucky.

GIANT OF THE EARTH (1955). 26 minutes, black and white.
Produced by, and for sale by, the Colorado Mining Association, at $100.00 per print, including shipping case. NOT cleared for television.

This film explains exploration, prospecting, and mining of uranium

ores on the Colorado Plateau, and explains USAEC activities at Grand Junction, Colorado.

THE PETRIFIED RIVER (1956). 28 minutes, color.

Produced by the Union Carbide Corporation and the U. S. Bureau of Mines under the technical direction of USAEC. For sale by MPO Distribution, at $135.00 per print, including shipping case.

This nontechnical film for all audience levels describes how uranium was deposited during prehistoric, geologic ages; prospecting on the Colorado Plateau; mining and milling of uranium ores; and the use of the atom's energy for power and to produce radioisotopes for medical diagnosis and therapy, agriculture, industry and research.

THE PORTSMOUTH STORY (1957). 23 minutes, black and white.

Produced for USAEC's Oak Ridge Operations, and for sale by, Lookout Mountain Laboratory, USAF, at $44.00 per print, including shipping case.

This semitechnical film, for intermediate through college-level audiences, describes the construction of the USAEC gaseous diffusion uranium processing plant at Portsmouth, Ohio.

PRODUCTION OF URANIUM FEED MATERIALS (1959). 28 minutes, color.

Produced by USAEC Oak Ridge Operations. For sale by Capital Film Laboratories, at $87.31 per print, including shipping case.

This is a semitechnical film, for the high-school- and college-level audiences, describing the step-by-step processing of uranium ore concentrates to metal reduction and fabrication, in the USAEC feed materials plants at Fernald, Ohio, and Weldon Spring, Missouri.

THE SEARCH—URANIUM PROSPECTING AND MINING (1955). 23 minutes, black and white.

Produced by Columbia Broadcasting System-Television and the Colorado Mining Association. For sale by McGraw-Hill Book Co., at $145.00 per print, including shipping case. NOT cleared for television.

This is a nontechnical film, for intermediate through college-level audiences, telling the story of the exploration, prospecting, and mining of uranium ores on the Colorado Plateau.

CHALLENGE Series. 29 minutes each, black and white.

This series of films, each of which is described below, provides an in-depth description of basic research in the nuclear sciences at the USAEC Argonne National Laboratory. The films visit various facilities in presenting explanations, demonstrations, and

discussions of nuclear-science principles, research tools and methods, and the projects to which they apply. Leading scientists provide narration. Produced by Ross-McElroy Productions, Chicago, Illinois, for the National Educational Television and Radio Center, under a grant from Argonne National Laboratory. For sale by NET Film Service, at $125.00 per print, including shipping case.

THE ALCHEMIST'S DREAM (1965).

Transmutation of metals, the dream of the alchemists in the Middle Ages, is shown and explained in its nuclear science context by members of the Argonne Chemistry Division. A minute quantity of berkelium is produced by bombarding curium with deuterons from a cyclotron. The berkelium is separated and purified behind the thick walls of a newly constructed hot laboratory for research with man-made elements.

THE ART OF SEPARATION (1962).

This film deals with the separation of chemical compounds into basic substances in the purest form possible by the process known as chromatography and with the importance of that process in chemistry work. Using radiation, the chemist is able to work with much greater speed and ease in the field of chromatography. The basic principles and various methods of modern chromatography are explained and demonstrated. Actual separation of a chemical compound is shown.

ATOMIC FURNACES (1962).

The operation, principles, and scientific applications of nuclear reactors, used as research tools in various projects, are briefly described. Types of research that reactors and associated equipment make possible are shown at length. The Gamma Ray Spectrometer, the Neutron Chopper, and a new reactor designed specifically for high- and low-radiation experiments in biology are also described.

A BREEDER IN THE DESERT (1965).

Argonne's Experimental Breeder Reactor II at the National Reactor Testing Station in Idaho is shown in detail, and many of the features and operating characteristics of a large-scale fast breeder reactor are described. The EBR-II Fuel Cycle Facility, first nuclear fuel reprocessing plant completely integrated with a reactor, is shown in operation.

BUILDING BLOCKS OF LIFE (1962).

Unique fragments of molecules caused by radiation in living sys-

tems, which are known as free radicals, either kill or seriously damage living cells. The how and why of both the particles and the damage they cause is the topic of this film.

A CHEMICAL SOMERSAULT (1965).

A commonly accepted scientific maxim, that the inert gases will not form chemical compounds, is shown to be false in this film depicting some of the research of the Argonne fluorine chemistry group. The making of xenon-fluorine compounds is illustrated with laboratory equipment. Research into structures of molecules of these compounds is shown and explained.

DOWN ON THE FARM (1965).

Algae are grown in heavy water in a unique "farm" at Argonne to obtain organic compounds in which the atoms of ordinary hydrogen are replaced by atoms of deuterium. Scientists show how these deuterated compounds are employed in studies of photosynthesis and other metabolic processes. The presence of deuterium in place of ordinary hydrogen is shown to have a slowing-down effect on many life processes.

FOUNDATIONS FOR THE FUTURE (1962).

Problems that are still to be solved by nuclear scientists are discussed in this film. Areas of particular interest to the scientist in his work now and in the future are identified as being the effects of radiation, the peaceful uses of radiation, and the dangers of radiation.

THE FUEL OF THE FUTURE (1965).

Special precautions and techniques employed in working with plutonium are shown in a unique engineering laboratory, the Argonne Fuel Fabrication Facility, where work is performed within sealed glove boxes under an inert atmosphere. The manufacture of experimental reactor fuel pins containing plutonium is illustrated step-by-step.

HARNESSING THE RAINBOW (1965).

Uses of spectroscopy in a nuclear laboratory are illustrated with instruments ranging in complexity from a simple prism to one of the world's largest and most complex light spectrographs. Argonne scientists describe the identification of line spectra as a means of studying atomic structure.

THE IMMUNE RESPONSE (1962).

This film is concerned with the mechanism by which the body

builds antibodies against disease and other foreign substances and with the effects of radiation on this immunizing response. In a demonstration the experimental procedures of the irradiation of rabbits with X-rays is shown and conclusions are discussed.

INVISIBLE BULLETS (1962).

This film introduces the series and establishes the basic knowledge about radiation necessary for an understanding of the other films in the series. The meaning of radiation, its natural sources, the various forms it takes, and how it is used in research are explained. The difference between alpha and beta particles and between gamma rays and X-rays is described.

THE LIVING SOLID (1962).

This film shows that bone is not a fairly stable substance but is active, living matter, constantly remodeling and reforming itself. The importance of bone to the entire body as a supplier of calcium is emphasized, and the systems by which this calcium gets from bone to blood and vice versa are illustrated. Effects of radiation are illustrated in photographs of bone cross-sections.

MACHINES THAT THINK (1965).

Research at Argonne into the future scientific uses of electronic computers is shown in this presentation which stresses nonnumerical manipulations of symbols. Computers are taught to make qualitative judgments, to interpret the significance of patterns such as spark chamber photographs, and to control laboratory experimental apparatus.

MICROSCOPE FOR THE UNKNOWN (1965).

The Zero Gradient Proton Synchrotron at Argonne National Laboratory is the scene of this presentation depicting types of experimental apparatus used in high energy physics research. Principles of "track detectors" such as the bubble chamber and the spark chamber are described, and the interpretation of track photographs is explained. A large spark chamber facility for detecting neutrinos and the 30-inch MURA bubble chamber are illustrated in detail.

RADIATION AND THE POPULATION (1962).

Because genetic damage is one of the most serious effects of radiation, the U. S. Atomic Energy Commission genetics program is designed to learn how radiation damages cells and what the long term effects of such damage might be. The film explains how radiation causes mutations and how these mutations

are passed on to succeeding generations. Mutation research is illustrated with results of experimentation on generations of mice and includes discussion of work with fruit flies and induced mutations. Fallout and its implications are also discussed.

SEARCHING FOR THE ULTIMATE (1962).

Atomic structure, one of the most basic forms of nuclear research, permits the scientist to discover the nature of the universe through the use of atom smashers or particle accelerators. The machines produce intense beams of radiation which enable study of the structure of the atom, the nucleus, and the basic components of the nucleus. This film explains how accelerators operate and shows one of the world's largest particle accelerators being constructed. Sub-nuclear particles and the concept of matter and anti-matter are also explained.

TESTING FOR TOMORROW (1965).

Aspects of nondestructive testing as employed in a nuclear laboratory, are depicted. Among the techniques, many of them newly developed, are neutron radiography, eddy current testing, ultrasonic detection of voids, and ultrasonic television scanning.

TIME—THE SUREST POISON (1962).

This film explores the natural process of aging and the methods used in its study. Aging might be considered one of the deleterious side effects of radiation since radiation injury resembles natural aging in so many ways. Results of study of the aging process involving the use of radiation are presented. The conduct of research on animals using low-level gamma irradiation is illustrated.

TRACING AIRBORNE RADIOACTIVITY (1962).

The principle of air being able to cleanse itself of poisonous substances, including those which are radioactive, is covered in this film. Atmospheric fallout and methods now being used to determine and study such fallout are examined. Fallout studies are discussed which relate man and his environment.

TRACING LIVING CELLS (1962).

Radioactivity is often mankind's servant. In recent years, the use of radioactive isotopes in the study of cell division and in medical therapy has helped man overcome disease. This film demonstrates some of the many helpful and healthful uses of atomic energy, including use of radioactive tracers in blood and cancer research.

WORKING WITH RADIATION (1962).

When properly handled in the laboratory, radioactive materials constitute little danger. This film shows precautions used in working with radiation as well as research effort being made to gain more knowledge about handling radiation. "Hot caves" (radiation chambers) using remote-control mechanical manipulators, caves using electronic type manipulators, and giant caves using heavy-duty manipulators illustrate the safety methods mentioned. Methods used to dispose of radioactive waste materials are also shown.

THE MAGIC OF THE ATOM Series.

This non-technical series was produced by, and is for sale by, The Handel Film Corporation. Most of the films in the series are 12½ minutes, black and white, and for sale at $65.00, except where indicated. These films are NOT cleared for television except with the express permission of the producer. In some cases, Audio-Visual Branch, Division of Public Information, USAEC, Washington, D. C. 20545, will arrange for television clearance, on request.

THE ATOM AND THE DOCTOR (1954).

Shows three applications of radioisotopes in medicine; testing for leukemia and other blood disorders with radioiron; diagnosis of thyroid conditions with radioiodine "cocktails," and cancer research and therapy with radiogallium.

THE ATOM AND THE WEATHER (1956).

Shows weather installations used at atomic energy plants to protect residents of neighboring communities; how colored smoke is used at Brookhaven to verify safe wind patterns before radioactive stack gases are released to the atmosphere; why nuclear test explosions have no effect on the weather; how patterns of radioactive fallout from tests are predicted and traced to protect the public; and how radioactivity serves as a tool in meteorological research.

THE ATOM IN INDUSTRY (1954).

Describes conversion of nuclear heat to electricity; heat-transfer experiments; use of radiation sources in thickness gauging, and in "X-ray" inspection of casting flaws. Suggests other industrial uses.

THE ATOM IN THE HOSPITAL (1961).

Also available in color at $130.00 per print.

At the City of Hope Medical Center, the following facilities are shown: (1) the stationary cobalt source that uses radioactive cobalt to treat various forms of malignancies; (2) a rotational therapy unit called the "cesium ring," which revolves around the patient and focuses its beam on the diseased area; and (3) the total-body irradiation chamber for studying the effects of radiation on living things. Studies can be carried out to determine the effects of massive doses of radiation. Data from these studies will be used for civil defense purposes, for investigating skin grafts and organ transplants, etc. At the UCLA Medical Center the total-body counter facility, which measures the slight radioactivity normally present in the animal or human body, is shown. The counting facility makes it possible to employ new diagnostic procedures requiring much smaller amounts of radioactive materials by eliminating practically all background radiation.

ATOM SMASHERS (1954).

Explains purposes, principles and methods of particle accelerators. Shows how swift atomic projectiles "smash" atomic nuclei apart for scientific examination of subatomic particles. Views of various particle accelerators, including the first 4-inch Cyclotron, the giant Bevatron, the Cosmotron, and of photographic trails left by smashed atoms.

ATOMIC AGE FARMER (1955).

Shows three examples of use of the atom in agricultural research; irradiation of corn at Brookhaven for development of stronger strains; studies at Oak Ridge to learn more about growth processes of domestic animals; and "Atomic Tracer Farm" at Argonne, where plants grown in a radioactive atmosphere produce radioactive drugs.

THE ATOMIC ALCHEMIST (1954)

Illustrates role of chemistry in nuclear development, how atomic energy products are opening new fields in chemistry, effects of radiation on liquids and on solids, and the search for new elements.

ATOMIC BIOLOGY FOR MEDICINE (1956).

Explains experiments to discover effects of radiation on mammals, including effects on lungs, eyes, bones and other tissues, cell division, and tumors.

ATOMIC CITIES (1956).

Shows precautions taken to assure that residents of communities near atomic energy installations are not endangered by the plant's use of radioactive materials. Describes routine checks of sur-

rounding soil, vegetation, and air for radioactivity; explains problems of disposing of radioactive wastes and methods of solution in use or under study.

ATOMIC DETECTIVE (1956).

Explains the different basic types of radiation and the various detection and monitoring devices developed to handle each type. Illustrates how the devices are used in industry, hospitals, research laboratories, and uranium prospecting. Shows assembly of a small unit.

THE ATOMIC FINGERPRINT (1964).

Produced under the technical supervision of the USAEC and Dr. Vincent P. Guinn, General Atomic Division, General Dynamics; and for sale at $67.50 in black and white, and $135.00 per print in color.

This film explains neutron activation analysis, a highly sensitive and powerful analytical technique with wide applications in the basic and applied sciences, which involves the use of neutrons to make substances radioactive, followed by analysis of the radiations emitted, to determine which elements are present and their amounts. The film demonstrates some of the many applications of neutron activation analysis in crime detection, geology and soil science, analysis of art and archeological objects, oil refining, agriculture, electronics, biology and medicine, and space sciences. Various techniques of neutron activation — making a sample radioactive — are explained, as well as the instruments and methods used in analyzing the activated samples. These include the use of the gamma-ray spectrometer and the technique of "spectrum stripping" — the electronic subtraction of the gamma-ray spectra of one or more known elements from that of a multi-element sample.

ATOMIC FURNACES (1955).

Explains purposes and principles of nuclear reactors and shows several in action at Brookhaven, Oak Ridge, and Los Alamos; the first atomic pile at Chicago; cutaway views of a typical reactor; and irradiation of material in a reactor.

ATOMIC GOLD RUSH (1956).

Shows prospecting for uranium by airplane and on foot, staking a claim, sample core drilling, core analysis, and mining.

THE ATOMIC GREENHOUSE (1954).

Shows step by step the use of radioisotopes to trace a plant's absorption of agricultural lime from the soil. Explains how effectiveness of plant's utilization is determined, and why such

tests can improve crops by pointing to most efficient use of fertilizers.

ATOMIC METALLURGY (1955).

Shows development, testing, and use of new metals needed to withstand powerful radiation and unprecedented heat produced by nuclear reactions. Includes work at Knolls, Argonne, Hanford, and New Brunswick.

THE ATOMIC PHARMACY (1954).

Describes the storage and handling of radioisotopes, and illustrates remote-control devices for safe manipulation of radioactive liquids. Explains use of radioisotopes in hospitals, research laboratories, and industrial facilities.

ATOMIC POWER PRODUCTION (1964). 14 minutes, color and black and white.

Available in color at $150.00 per print, and in black and white at $75.00 per print.

Opening with an explanation of the growing demand for electrical power, produced today primarily through hydro-electric means and the burning of fossil fuels (coal, gas, and oil), the film tells of the need for harnessing nuclear energy. With animation, an explanation is given of how the heat created by the controlled chain reaction of atomic fuel in a reactor is converted to electrical power. Several types of power reactors and their basic differences are discussed: the boiling water reactor, the pressurized water reactor, one using a liquid sodium coolant, and one using an organic coolant. The principle of the "breeder" reactor is explained and its importance stressed. The film also discusses the care and safety of design, construction, maintenance and operation of atomic power plants.

THE ATOMIC ZOO (1954).

Shows experiments with sheep, fowl, and fish to determine how radioactivity affects basic food products.

ATOMS FOR HEALTH (1956).

Illustrates two methods of diagnosis and treatment possible with radiations: a new diagnostic test of the liver, and cancer therapy with a new radioactive cobalt device, the "Theratron." Presents the case histories step by step.

THE ETERNAL CYCLE (1954).

Illustrates use of radioisotope tracers in biological research. Includes study of iron absorption by the blood cells; use of sugars by the body; and biological cycling studies in which "tagged"

materials are traced throughout their movement from the soil to plants and animals, and the amounts of absorption during each stage are determined.

THE INDUSTRIAL ATOM (1956).

Shows use of radioisotopes to detect hidden leaks, locate stuck scrapers in oil pipelines, and for piston ring wear studies to test quality of lubricating oils.

JOBS IN ATOMIC ENERGY (1956).

Shows the diversity of the many jobs created by the rapid development of atomic energy. Includes scientists, engineers, technicians, production, and clerical workers employed in research, power production, industrial applications, agriculture, medicine, and raw materials.

THE MASTER SLAVE (1954).

Demonstrates some of the remote-control devices and methods which make it possible to manipulate highly radioactive materials from a safe distance.

POWER UNLIMITED (1955).

Explains how electricity is produced by atomic energy and shows the first generation of usable electric power in the USAEC's Experimental Breeder Reactor in Idaho.

PROTECTING THE ATOMIC WORKER (1954).

Explains safeguards used to protect men and women working closely with radiation: film badges, ionization pencils, shielding, decontamination, laundry, health monitors, blood counts, breath testing, and health records.

RADIATION: SILENT SERVANT OF MANKIND (1956).

Depicts four uses of controlled radiation to benefit mankind: bombardment of plants from a radioactive cobalt source, to induce genetic changes for study and crop improvement; irradiation of deep-seated tumors with a beam from a particle accelerator; therapy of thyroid cancer with radioactive iodine; and possibilities for treating brain tumors.

THE RIDDLE OF PHOTOSYNTHESIS (1965 version). 14½ minutes, color and black and white.

Available in color at $160.00 per print, and in black and white at $ 80.00 per print.

Shows role of photosynthesis in growth of food, and use of radiocarbon

to explore the process. Describes, with animation, key steps in one of the experiments designed to help solve the riddle.

TAGGING THE ATOM (1954).

Describes the use of radioisotope "tracers" as scientific research tools. Shows details of radioisotope production, methods of handling, purification, and packaging.

UNDERSTANDING THE ATOM Series.

This series of semitechnical lecture films is designed for inclusion in a high school senior-level chemistry or physics course, or it could be used as an introductional unit in nuclear science at the college level. The lecture-demonstration is presented by Dr. Ralph T. Overman, Chairman, Special Training Division of the USAEC's Oak Ridge Institute of Nuclear Studies.

ALPHA, BETA, AND GAMMA (1962). 44 minutes.

Produced by the former New York University Television Center under the direction of the USAEC's Division of Isotope Development. For sale by Byron Motion Pictures, at $47.12 per print, including shipping case.

The film gives some insight into the origin and nature of alpha, beta, and gamma radiation. After a short discussion of the methods of describing atoms and the introduction of the energy-level concept, the lecturer introduces the potential-energy well model of the nucleus. This, together with the barrier model, is used as the frame of reference for a variety of other nuclear concepts. The energetics in alpha emission and the Gamow tunneling effect are used to describe alpha-ray emission and the energy levels in the nucleus. The lecturer discusses neutron absorption leading to the formation of nuclei having neutron–proton ratios differing from stable or naturally occurring nuclei. The transformation of excess neutrons into negative beta radiation and the return to stability are considered in some detail. Similarly, gamma radiation arising from a nuclear cooling process is described. The nuclear well model is then used to introduce decay schemes.

THE ATOM IN PHYSICAL SCIENCE (1964). 26 minutes.

Produced by the Educational Broadcasting Corporation, New York City, under the direction of the USAEC's Division of Nuclear Education and Training and the Oak Ridge Institute of Nuclear Studies. For sale by Byron Motion Pictures, at $33.75 per print, including shipping case, F.O.B. Washington, D. C.

This film is a lecture by Dr. Glenn T. Seaborg, Chairman of the U. S. Atomic Energy Commission, who is introduced by Dr. Ralph T. Overman, Chairman, Special Training Division of the USAEC's Oak Ridge

Institute of Nuclear Studies and regular lecturer of the series. Dr. Seaborg outlines briefly the types of experiments which were used in the production of transuranium elements. These have been discovered using exceedingly ingenious approaches involving quite complex electronics and highly refined chemical techniques. Various sources have been employed in producing the new elements. These have included various types of accelerators, uranium reactors, and in several cases the first production of elements was in weapons testing experiments. The higher atomic number elements have been produced by the bombardment of targets with nuclei such as boron and nitrogen. Dr. Seaborg points out that elements not yet discovered will be characterized by very short half lives and will require electronic means for their testing rather than chemical techniques.

The film discusses applications to other chemical problems such as the mechanism of photosynthesis and the use of special techniques such as isotope dilution analysis. Of considerable interest also is the description of Carbon-14 dating.

The lecturer closes with a strong statement regarding the need for scientists and the importance of good scientific training in schools.

NUCLEAR REACTIONS (1963). 29½ minutes.

Produced by the Educational Broadcasting Corporation, New York City, under the direction of the USAEC's Division of Nuclear Education and Training. For sale by Byron Motion Pictures, at $33.06 per print, including shipping case.

This segment of the series continues the discussion of the film "Alpha, Beta, and Gamma," and involves some of the basic concepts of nuclear reactions. Neutron capture processes are described with the gamma emission and particle ejection reactions being studied. Nuclear fission is also discussed. As an example of the calculations involved in nuclear reactions, the film describes the activation of a gold sample in a nuclear reactor. Emphasis is placed on the minute quantities which can be detected with the subsequent applications to the technique of activation analysis. It is shown that hundredths of a part per billion of certain materials can be detected by nuclear techniques.

PROPERTIES OF RADIATION (1962). 30 minutes.

Produced by the Educational Broadcasting Corporation, New York City, under the direction of the USAEC's Division of Isotope Development. For sale by Byron Motion Pictures, at $32.06 per print, including shipping case.

This film includes a discussion of general problems of radiation decay, such as the laws of radioactive decay, including the concept of half life. Statistical considerations are introduced, and the basic notion of the standard deviation in counts expected in various experiments is described. The energy spectrum from alpha and beta emitters is con-

sidered, and the use of absorption curves to study the energy distribution of beta radiation is introduced. The density thickness expressed in milligrams per square centimeter is introduced as a useful term. The film also considers problems of self-absorption, special activity, and backscattering of radiation.

RADIATION AND MATTER (1962). 44 minutes.

Produced by the former New York University Television Center under the direction of the USAEC's Division of Isotope Development. For sale by Byron Motion Pictures at $45.95 per print, including shipping case.

The film, which considers the interaction of radiation with matter, develops the various processes by which alpha, beta, and gamma radiation give up energy to their surroundings. The similarities and differences of alpha and beta particles are considered, with emphasis on the methods by which ionization occurs. It is pointed out that, since the interaction of radiations in the absorption process takes place essentially only with orbital electrons on the atoms, the density of electrons in matter is the determining factor. The relation between energy of a particle and the number of ion pairs formed is also explained. The lecturer follows with a discussion of gamma, or electromagnetic radiation, which is described as a nonionizing event in terms of the initial interaction between photons and atoms. Four possibilities of gamma-ray absorption (excitation, photoelectric effect, Compton effect, and pair production) are discussed. The viewer, however, is alerted to the fact that there is only a certain probability that one particular process may take place rather than another, depending upon the energy of the gamma ray. This probability, expressed as absorption coefficient, is then related to each of the four absorption processes.

RADIATION DETECTION BY IONIZATION (1962). 30 minutes.

Produced by the Educational Broadcasting Corporation, New York City, under the direction of the USAEC's Division of Isotope Development. For sale by Byron Motion Pictures, at $32.53 per print, including shipping case.

The basic principles of ionization detectors are described, particularly in relation to the pulse height as a function of voltage curves. Brief descriptions of ionization chambers, proportional counters, and Geiger counters are included, and examples of instruments operating in these regions are shown. Special consideration is given to Geiger counters, including the mechanism of gas quenching and the determination of a counting-rate plateau. The resolving time of a counter is discussed, as well as various components of a practical instrument, including amplifiers and scalers.

RADIATION DETECTION BY SCINTILLATION (1962). 30 minutes.
Produced by the Educational Broadcasting Corporation, New York City, under the direction of the USAEC's Division of Isotope Development. For sale by Byron Motion Pictures, at $31.77 per print, including shipping case.

A short review of gamma interactions with matter is shown, with particular reference to useful scintillation crystals. The scintillation process is described, and the efficiency of the conversion of gamma radiation to visible light in the scintillator is discussed. Solid and liquid scintillators are shown along with special detection devices using this principle. A description of the operation of a photomultiplier tube is given, and the concept of pulse height is developed. The principle of operation of a pulse-height analyzer is shown, and the spectrum obtained with such an instrument is shown and discussed. Brief mention is made of solid-state radiation detectors.

RADIOISOTOPE APPLICATIONS IN INDUSTRY (1964). 26½ minutes.
Produced by the Educational Broadcasting Corporation, New York City, under the joint direction of USAEC's Divisions of Isotope Development and Nuclear Education and Training. For sale by Byron Motion Pictures, at $28.98 per print, including shipping case, F.O.B. Washington, D. C.

This film discusses some of the practical, simple, and easily understood methods of putting radioisotopes to work in industry. The program features Dr. Paul C. Aebersold, Director, Division of Isotope Development, USAEC, who is introduced by Dr. Ralph T. Overman, Chairman, Special Training Division of the USAEC's Oak Ridge Institute of Nuclear Studies and regular lecturer of the series. Using actual radioisotope sources, Dr. Aebersold gives various demonstrations of the degree of their penetrating radiations, the extent to which several types of materials can reduce them and the sensitive methods of detecting them. He explains how the principles involved in the demonstrations are applied to practical uses in industry. Narrating the film, he tells of the actual use of radioisotope gauges in tire plants and steel mills, of radioisotope tracers used in the petroleum and chemical industries, of radioisotope density gauges used in food plants and of other uses of radioisotopes in industry which improve the efficiency of production and the quality of the product.

RADIOISOTOPE APPLICATIONS IN MEDICINE (1964). 26 minutes.
Produced by the Educational Broadcasting Corporation, New York City, under the joint direction of the USAEC's Divisions of Isotope Development and Nuclear Education and Training, and the Oak Ridge Institute of Nuclear Studies. For sale by Byron Motion Pictures, at $31.50 per print, including shipping case, F.O.B. Washington, D. C.

This film traces the development of the use of radioisotopes and radiation in the field of medicine from the early work by Hevesy to the present. The program is presented by Dr. John Cooper of Northwestern University, who is introduced by Dr. Ralph T. Overman, Chairman, Special Training Division of the USAEC's Oak Ridge Institute of Nuclear Studies and regular lecturer of the series. Dr. Cooper's discussion includes the area of medical research, diagnosis and therapy. The source of cholesterol in the human body and the applications of this basic information to clinical studies of atherosclerosis is described. Similarly, studies with cobalt-labeled vitamin B-12, used to study pernicious anemia, are also discussed. Most of the information now known about thyroid physiology and pathology has been determined with the aid of various iodine radioisotopes, and standard diagnostic measurements and scanning are described in the film. Brain tumor localization is also covered. A very important area of radioisotope use is the determination of a variety of body fluid volumes such as blood and plasma. Red cell volume and lifetime can also be measured using labeled cells. The film explains how radioisotopes are used for the treatment of various diseases, including hyperthyroidism and cancer.

RADIOISOTOPES IN BIOLOGY AND AGRICULTURE (1964). 26 minutes.

Produced by the Educational Broadcasting Corporation, New York City, under the joint direction of USAEC's Divisions of Isotope Development and Nuclear Education and Training, and the Oak Ridge Institute of Nuclear Studies. For sale by Bryon Motion Pictures, at $32.54 per print, including shipping case, F.O.B. Washington, D. C.

This film is a lecture by Dr. Howard Curtis of Brookhaven National Laboratory, who is introduced by Dr. Ralph T. Overman, Chairman, Special Training Division of the USAEC's Oak Ridge Institute of Nuclear Studies and regular lecturer of the series. Dr. Curtis touches on some of the up-to-date applications of atomic energy to biology and agriculture. Reference is made to the importance of radioisotopic tracers in the determination of the structure and role of nucleic acids and other cellular components. This work is done either with various types of counters or autoradiography. For example, the position of DNA in the cell has been determined quite specifically. This information has been exceedingly important in the breaking of the genetic code by determining the area of the sub units on the backbone of the genetically important molecules. Similarly, the structure of proteins has been determined using radioactive tracers. In addition to tracer applications, a great deal of information has been gained by studying radiation effects. This has been important both from the standpoint of fundamental knowledge about growth and also the practical applications of economically important mutations. Interesting examples of plant breed-

ing projects are shown. In the animal sciences, important information on the study of aging has come out of the use of radiation as a stress. Various theories of aging have been tested, and it appears that aging is primarily associated with the damage to chromosomes. If the DNA is damaged, animals grow older because of basic instability of DNA. Other examples of the importance of radiation to molecular biology are shown.

RADIOLOGICAL SAFETY (1963). 30 minutes.

Produced by the Educational Broadcasting Corporation, New York City, under the direction of USAEC's Division of Nuclear Education and Training. For sale by Byron Motion Pictures, at $33.06 per print, including shipping case.

This film examines the field of radiological safety or health physics, and tries to give a basis for a perspective on potential biological radiation damage. It first considers background radiation and the nature of the difference in this radiation. Larger doses of radiation can be a potential cause of both somatic (direct bodily) damage and genetic (hereditary) damage, and consideration is given to the maximum permissible limits or radiation guide levels which have been established by various radiological protection committees and the Federal Radiation Council. Various units are described, with these including the roentgen, the rad, and the rem. The latter unit is a measure of the biological dose equivalent and considers the relative biological effectiveness (RBE) of the radiation. Consideration is also given to the maximum permissible concentration of radioisotopes in water or air, and the problems involved in the localization of radioactive materials in the body. Various factors that must be controlled in reducing the radiation hazard include the quantity of radioactive material, the distance, the time of exposure, and shielding. Internal exposure must be minimized by the use of special laboratory facilities and techniques which are required to minimize the admission of radioactive isotopes into the body. The importance of having calibrated instruments available is stressed in any program involving the use of radiation sources.

ADDITIONAL TITLES

This section contains detailed information and full descriptions on films released since the publication of the 1965 edition.

ATOMS FOR SPACE AND SNAP

ATOMIC ENERGY FOR SPACE (1966). 17 minutes, color.

Produced by the Handel Film Corporation with the cooperation of the USAEC and the National Aeronautics and Space Administration. For sale by Handel Film Corporation at $195.00 per print, F.O.B. Los Angeles. Available for loan (*free*) from AEC Headquarters and field libraries. Permission for use of AEC library prints for public service or educational telecasting must be obtained from the Chief, Audio-Visual Branch, Division of Public Information, U. S. Atomic Energy Commission, Washington, D. C. 20545.

The film explains why only atomic energy can satisfy some of the future power needs for the exploration of deep space. Nuclear energy for space is being developed through two basic applications: the nuclear rocket for space propulsion, and in isotopic or reactor power plants which can produce the electricity essential for spacecraft operations.

It is explained that the nuclear rocket being developed jointly by the AEC and NASA in the Rover program, which will be essential for manned flights to the planets of our solar system and beyond, will use a nuclear reactor, or "atomic furnace," to heat, vaporize and expand liquid hydrogen, and expel it from a nozzle to produce thrust.

The efficiency of nuclear and chemical rockets is compared, and it is noted that there will be a great reduction in the weight of the nuclear propulsion system as opposed to chemical rockets. The "fission" process—to produce nuclear heat—is explained with animation, as well as how this heat is used to produce thrust in the versatile nuclear engine. Shown also are the KIWI and NERVA nuclear reactor systems during "nozzle-up" ground tests. Scientists look forward to nuclear engines of the Phoebus series that will develop about 275,000 pounds of thrust for deep space probes.

The film then turns to the SNAP devices—Systems for Nuclear Auxiliary Power: devices that supply electricity for all the various housekeeping and operational sub-systems of spacecraft and satellites (radio, TV, transmitters, computers, etc.). There are two types: isotopic generators (atomic batteries) and the nuclear power reactor. The film shows the first isotopic space generator which went into orbit in a satellite in 1961. By animation, it is illustrated how the decay of radioisotopic materials produces heat which is converted directly to electricity by thermocouples. Also explained and illustrated is the nuclear reactor for auxiliary power, with scenes of the 1965 launch of the first reactor into orbit. This SNAP-10A reactor produced a half million watt-hours of electricity during operation. Future astronauts will travel in spacecraft propelled by nuclear rockets. The huge array of instruments and control devices in their spacecraft and those they will

leave on the moon and planets will receive electricity from nuclear power generators.

FIRST REACTOR IN SPACE: SNAP-10A (1966). 14½ minutes, color.

Produced for the USAEC by Atomics International. For sale by Hollywood Film Enterprises, Inc., 6060 Sunset Blvd., Hollywood, Calif. 90028, at $40.40 per print, including shipping case, F.O.B. Hollywood. Also available for loan from the Library, Atomics International, P. O. Box 309, Canoga Park, Calif. 91304.

Development, launch and results of the world's first nuclear reactor power system to operate in space are described in this semi-technical film, which will be of interest to a wide range of audiences, including high schools. The SNAP-10A unit, consisting of a nuclear reactor and power conversion unit, was thrust into a 700 nautical mile, nearly circular orbit in April 1965 from Vandenberg Air Force Base. Following remote start-up, the power plant was operated successfully for 43 days and produced more than 500,000 watt-hours of electricity.

SNAP-10A, a compact reactor, is coupled to a thermoelectric converter-radiator unit which converts heat from fission in the reactor directly into electricity. The heat is transferred to the power conversion unit by a liquid metal coolant, an alloy of sodium and potassium. The SNAP-10A system generates approximately 500 electrical watts.

The motion picture also describes safety of the SNAP reactor during fabrication, testing, transport, installation, launch and use in space, as well as data obtained from the flight. Detailed sequences filmed at Atomics International on fabrication and testing show the simplicity and compactness of the reactor.

See also "SNAPSHOT," a film which describes pre-flight preparations, development, testing and qualification system tests in greater detail.

SNAP-8: SYSTEM FOR NUCLEAR AUXILIARY POWER (1966). 10 minutes, color.

Produced by the Aerojet-General Corporation. Queries on sale of prints should be directed to Aerojet General Corporation, Von Karman Center, Azusa, California.

In order to travel in space, man must take his own environment with him. This requires power to supply oxygen, drinking water, air conditioning, lighting and to operate communication systems; in short: power to maintain equipment and sustain life itself. Simulating the earth's environment is by no means a new idea. Crews of nuclear submarines live in health and comfort for months at a time while submerged in a hostile environment. This is possible because nuclear energy provides a source of continuous, uninterrupted power. Space voyagers too, need this same kind of power, and this is where SNAP-8 comes in—using a mercury-vapor turbo-generator system to convert heat from a nuclear reactor into useful electricity.

The film shows the principal components and, in animation, illustrates and explains the operation of the system. Actual fabrication of components and subsystems is also shown, as well as the extensive testing programs currently underway. Thus, SNAP-8 is not a drawing on a drafting table, but a technological reality. Animation sequences are used to depict potential missions of the SNAP-8 system, including power for: TV satellites to broadcast all over the earth, orbiting space stations to support earth observation and space research, maintenance of permanent lunar bases, and manned explorations beyond the moon.

BIOLOGY AND MEDICINE

RADIOISOTOPE SCANNING IN MEDICINE (1965). 16 minutes, color.
Produced by the Handel Film Corporation with the cooperation of the USAEC and the Laboratory of Nuclear Medicine and Radiation Biology at UCLA. For sale by Handel Film Corporation, at $180.00 per print, F.O.B. Los Angeles. Permission for use of AEC library prints for public service or educational telecasting must be obtained from the Audio Visual Branch, Division of Public Information, U. S. Atomic Energy Commission, Washington, D. C. 20545.

Development of scanning equipment in combination with new radioactive drugs has produced important advances in medical diagnosis. Radioactive tracers give off signals that can be converted into an image. Administered to patients, these radioactive materials, in effect, make pictures revealing valuable information about the size, shape, position and functioning of lungs, thyroid glands, bones, liver, kidneys, heart, spleen, and brain. The signals emitted from the organ-selective atomic tracers are registered by a scintillation detector which moves over the test area on the patient. This motion picture explains the methods of organ scanning, and gives examples: thyroid and lung scanning with radioactive iodine. Scans are also shown of the chest, brain, liver, and kidneys. Visualization of the malfunctioning of human organs is produced in black and white or in color on paper and/or on photographic film. The radiation detection and printout devices are described.

RETURN TO BIKINI (1966). 23½ minutes, color.
Produced for the USAEC by the Laboratory of Radiation Biology, University of Washington. For sale by the Motion Picture Service, U. S. Department of Agriculture, Washington, D. C. 20250, at $97.00 per print, including shipping case.

Describes the latest scientific survey by a team from the Laboratory of Radiation Biology of the University of Washington to determine the condition of Bikini and Eniwetok atolls six years after the last nuclear test

detonations, and how it is found that there has been tremendous recovery to the biological processes that form the life chain linking man with the tiniest plants, fish and animals in the atolls.

Under the AEC contract, scientists of the University have been studying the biological after-effects of nuclear tests at the mid-Pacific atolls intermittently since 1946. Returning in August 1964, the team of biologists sets out to determine how much radiation remains, what changes have occurred on the reefs, what has happened to birds, land animals and to fish in the lagoons, and what kinds of plants have come back.

The scientists find that: the islands are once again lush with vegetation, external radiation levels have dropped to levels safe for people and the radioactive burdens in animals and plants are low, rainwater in the soil is safe for drinking, coconut trees are increasing again, all the expected species of fish and sea life are to be found, birds are thriving, and that the sea — surging through the coral reefs — has cleaned, restored and nourished the atolls. The scientists conclude that the gross results of nuclear testing are fading, and what little biological damage remains is rapidly healing.

EDUCATION

TOMORROW'S SCIENTISTS AT ARGONNE (1965). 13½ minutes, black and white.

Produced by USAEC's Argonne National Laboratory. For sale by Geo. W. Colburn Laboratory, Inc., at $42.14 per print, including shipping case, F.O.B. Chicago.

Shows USAEC Special Award Winners, selected at the 16th National Science Fair-International at St. Louis, experiencing their "Nuclear Research Orientation Week" at Argonne National Laboratory near Chicago. After brief discussion of the science fair program and the St. Louis fair, the film includes highlights of science projects exhibited by the winners, and the student's inspection of some of Argonne's many research and development facilities. It concludes with a round-table discussion with a distinguished senior scientist, in which the young scientists consider the challenges awaiting them and the steps to be taken toward meeting those challenges. Suitable for high school students, for educators and parent groups, for educational television, and for advanced junior high school students.

INDUSTRIAL APPLICATIONS

FARM FRESH TO YOU (1966). 13½ minutes, color.

Produced for the USAEC's Division of Isotopes Development by

the Army Pictorial Center. For information about sale of prints, inquire at the Audio Visual Branch, Division of Public Information, USAEC, Washington, D. C. 20545.

Preservation of fresh fruits and vegetables by radiation pasteurization is described in this semi-technical film. After touching briefly on the high spoilage losses presently encountered in the marketing of fresh produce, the film presents graphic visual evidence of the reduced spoilage and extension of shelf life which can be obtained through the use of nuclear energy. The process of exposing foods to the energy of the atom in radiation research facilities is described, together with a simple animated version of what happens during exposure. Emphasis is placed on the fact that foods processed in this way are safe for human consumption, and that each radiation pasteurized food item will be approved by the U. S. Food and Drug Administration before it is offered for sale to the public.

THE FRESHER THE BETTER (1966). $13\frac{1}{2}$ minutes, color.

Produced for the USAEC's Division of Isotopes Development by the Army Pictorial Center. For information about sale of prints, inquire at the Audio Visual Branch, Division of Public Information, USAEC, Washington, D. C. 20545.

Preservation of fresh seafoods by radiation pasteurization, to extend refrigerated shelf life up to three times that of unirradiated fresh seafood, is described in this semi-technical film. The concept of using energy from atomic particles to kill or destroy microorganisms and other food spoilage bacteria is described in animated form, followed by sequences of actual research being performed. The Marine Products Development Irradiator, a semi-commercial scale food irradiation facility, is shown as products are being processed. The purpose of the film is to introduce the concept of radiation preservation of food, and to explain the process and its results. Emphasis is placed on the fact that foods processed in this way are safe for human consumption, and that each radiation pasteurized food item will be approved by the U. S. Food and Drug Administration before it is offered for sale to the public.

THE NUCLEAR WITNESS: ACTIVATION ANALYSIS IN CRIME INVESTIGATION (1966). 28 minutes, color.

Produced by the General Atomic Division of General Dynamics Corporation for the USAEC's Division of Isotope Development. For sale by McNamara Productions, Gateway West, Century City, Los Angeles, Calif. 90067, at $79.55 per print, including shipping case, F.O.B. Los Angeles.

The scientific crime investigator is ever searching for new and better techniques for the examination of physical evidence involved in crime investigations. This film describes, in a fascinating and non-technical manner, one of the most exciting new techniques in this field—a nu-

clear technique called, "Activation Analysis." As is shown in the film, this method is some 100 to 1,000 times more powerful (more sensitive) for the detection of most elements than methods currently available in the usual crime laboratory. This means that evidence-samples too small to be analyzed by other methods (even microscopic samples) can often be analyzed successfully by this new technique, and tell-tale bare trace concentrations can be measured. Frequently, the analysis can be done nondestructively—thus preserving the samples.

This highly sensitive and powerful analytical technique that has grown out of the study of peaceful uses of nuclear energy is a method of analyzing samples for various elements by bombarding them with neutrons, to make some of the elements radioactive, and then identifying and measuring the induced radioactivities to complete the quantitative analysis.

The film shows the application of activation analysis to the investigation of several illustrative types of criminal cases; murder, burglary, and narcotics peddling. The cases described are based on actual cases. One case is described all the way from the commission of the crime through the trial in court; the others from the crime through the laboratory investigation. The film is designed to be of particular interest to law enforcement people, members of the legal profession, university students, service organizations, and the educated layman.

NUCLEAR REACTORS AND POWER

ATOMIC POWER TODAY: SERVICE WITH SAFETY. 28½ minutes, color.

Produced for the Atomic Industrial Forum, Inc., and the USAEC by Seneca Productions, Inc. For information about the sale of prints, inquire at the Audio Visual Branch, Division of Public Information, USAEC, Washington, D. C. 20545.

Tells the story of central station atomic power plants and how they serve the country now and will continue to do so in the future. Starting with basic information on how electricity is produced from water power and fossil fuels such as oil, gas and coal, the film introduces atomic fuel as a vast new energy resource that helps keep down the cost of electricity. The film shows atomic fuel being fabricated and, through animation, how it is put to work in a nuclear reactor to produce heat which will ultimately be used to produce electricity.

The safety aspects of atomic power, including both natural and engineered safeguards, as well as the demand for dependability by the operating utility and by the customer, are discussed. We see utility conferences relating to a proposed atomic power plant and the care that goes into design and planning.

Since a permit from the AEC is needed before a nuclear power plant may be built, we follow the utility's application through the AEC regulatory review process: public documentation, review by the AEC Regulatory Staff, another review by the AEC's Advisory Committee on Reactor Safeguards and, finally, a public hearing conducted by an AEC Atomic Safety and Licensing Board. With the approval of the Board and the AEC, construction begins. We see the components of the reactor and associated equipment begin to take shape. Finally, as we see the completed structure, we learn that special operating teams are trained and licensed, and that another AEC review is necessary before an operating license is granted the utility.

Further safety considerations are explored, showing some of the relevant equipment and systems. We learn why it is impossible for a nuclear reactor to blow up like an atomic bomb. The main safety consideration is in maintaining the isolation of the radioactive fission products formed during normal operation. We learn that 99.99 percent of these ashes remain tightly locked within the fuel, and the fuel is removed about once a year from the plant site. The film also deals with handling of wastes and controlled release of material to the envrionment on a planned basis, according to Federal safety regulations.

When the plant finally goes "on the line," it joins other atomic power plants across the nation providing dependable electricity for our many needs. We see a sampling of these plants and the communities they serve, demonstrating that atomic power is here today, providing for our present and future electrical power needs.

PEACEFUL USES OF NUCLEAR EXPLOSIVES (PLOWSHARE)

PLOWSHARE (1965). 28 minutes, color.

Produced by USAEC's San Francisco Operations Office. For sale by W. A. Palmer Films, Inc., at $167.46 per print, including shipping case, F.O.B. San Francisco.

By using motion pictures and animation to describe the Commission's program for the safe use of nuclear explosives for civilian applications, this film introduces the Plowshare Program, presents the status of its development, and illustrates its ultimate research and development. The film explains the various potential uses of this enormous force of energy to perform tasks for the benefit of mankind, and explores the scope and range of the possible applications of nuclear explosives for mining and petroleum applications, for performing massive earth-moving and excavation projects, and, for utilization in scientific investigations. Safety problems are briefly discussed. The main theme of the film is that the United States, through its Plowshare Program,

is offering all nations the potential of harnessing the energy of nuclear explosions for accomplishing peaceful tasks that would otherwise be impossible or impractical.

SAFETY IN THE PLOWSHARE PROGRAM (1966). 22 minutes, color. Produced by USAEC's Nevada Operations Office. For sale by Consolidated Film Inudstries, at $67.83 per print, including shipping case, F.O.B. Hollywood.

This motion picture, which is a companion piece to the USAEC film "Plowshare," documents the means taken to insure the safety of the public during experiments or projects in the U. S. program to develop peaceful uses of nuclear explosives. The film relates the effects of underground explosions to the varying purposes for the explosions and to public safety.

Nuclear explosives, precisely controlled, are powerful, compact and relatively inexpensive sources of energy which may help produce oil and gas, mine minerals, dig harbors, canals, and mountain passes, and provide important scientific knowledge. Each of these applications uses one or more of the effects of nuclear explosions: heat, explosive force and radiation. The film explains that to allow for the safe and dependable use of nuclear explosives, each of these effects must be thoroughly understood. The effects, their safety implications, and the precautions taken for public safety are demonstrated.

The film explains that technical advances in the design of Plowshare explosives make it possible to reduce to a very small amount the radioactivity produced by an explosion. In cratering explosions, methods of emplacing the explosive underground result in the release to the atmosphere of only a small part of the radioactivity produced. In these explosions, as well as in explosions which are contained completely under the earth's surface, contamination of underground water supplies does not appear to be a major problem.

Other effects of nuclear explosions — ground shock, air blast, and dust clouds — require safety procedures similar to those taken in many large-scale conventional construction projects. Site choice, weather selection, and, in certain cases, temporary relocation of inhabitants are precautions taken to insure the public safety.

The motion picture goes through the steps that would be taken in any Plowshare project to protect the public and its property. The film shows the care and planning exercised in a particular project — from the initial safety analysis, to advisory opinions from other government and independent scientists, to final review and approval.

SAFETY, WASTE DISPOSAL, AND RADIATION HAZARDS

ATOMS ON THE MOVE: TRANSPORTATION OF RADIOACTIVE MATERIALS (1966). 24 minutes, color.

Produced by Bennie Korzen Productions for the USAEC. For information about print sales, inquire at the Audio Visual Branch, Division of Public Information, USAEC, Washington, D. C. 20545.

This non-technical film surveys the various means of transporting radioactive materials and the safety aspects underlying their packaging and handling. Using animation and live action photography, the film illustrates that by their very nature, radioactive materials are varied and so are the potential hazards associated with shipping and using them. By evaluating the form of the material and the kind and the quantity of radioactivity, one may determine how the materials are properly packaged for shipment. Most radioactive materials are safely shipped by common carrier. The film shows typical shipments enroute: atoms on the move everyday, everywhere by train, truck, aircraft and ship. Varied items are dealt with: ores; atomic fuel for reactors; spent fuel being returned for processing; atomic weapons; radioisotopes for medicine, research and industry; and atomic wastes being shipped for disposal. The film discusses responsibilities of agencies such as the AEC, the ICC, Bureau of Explosives, Federal Aviation Agency, Coast Guard and state and local offices. Also shown are some aspects of safety research and development designed to limit the consequences of an accident involving these materials. An accident situation and clean-up are shown. We learn that radioactive materials are invaluable tools and products in today's industry and in our daily lives, and how modern transportation moves these materials quickly, quietly, and safely.

R-A-P: RADIOLOGICAL ASSISTANCE PROGRAM (1965). 26½ minutes, color.

Produced for the USAEC by J. L. Feierbacher, with the technical assistance of AEC's Division of Operational Safety and AEC's Idaho Operations Office. For sale by Consolidated Film Industries at $79.93 per print, including shipping case, F.O.B. Hollywood.

Shows the readiness and proficiency of radiological assistance teams in various re-enacted instances of emergencies. This documentary film is aimed at the level of the educated laymen — audiences in state and local government, AEC and state licensees, the transportation industry, military and Civil Defense units, and others concerned with problems in dealing with radioactive materials.

The R-A-P team's effectiveness is shown to be dependent on the cooperation of other groups and individuals at different levels of govern-

ment and business. To illustrate this, there are three main stories in the film: The first traces the hunt for a radioactive source lost from a small industrial plant. The trail, via helicopter and police cars, takes the R-A-P team to a municipal dump. The second case is the problem of leaking radioactive vapor from a sealed system in a research laboratory. The third is the story of a fire in a uranium products plant that gives a R-A-P team the additional public information job of coping with a community which mistakenly assumes it is threatened with a disaster.

Since, despite every safeguard, accidents do happen — detailed reenactments in this film of the steps and measures taken to deal with these radiological emergencies show the operations of R-A-P teams as they put to work their specialized professional skills and equipment.

USAEC Division of Technical Information Extension, Oak Ridge, Tennessee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